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PROTHROMBIN AND VITAMIN K THERAPY*

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MUCH remains to be learned about the mechanism of blood clotting, and two fundamental questions still not conclusively settled are the extent to which clotting is an enzyme reaction, and the nature of the physiologic anticoagulant. Nevertheless, there is now general agreement that at least five substances take part in normal clotting. The first phase consists in the interaction of ionized calcium, a tissue or platelet derivative called thromboplastin, and prothrombin, which is probably part of the globulin fraction of plasma protein. By this reaction thrombin is formed, which in the second phase of clotting converts fibrinogen into fibrin.

Since the discovery[1] of vitamin K in 1935 and subsequent demonstration[2–6] of its importance in the formation of prothrombin, four methods have come into use for the measurement of prothrombin. In 1935 Quick[7] improved Howell's[8] method of determining the clotting time of recalcified plasma by adding an excess of thromboplastin before recalcification. From the clotting time a prothrombin value for the unknown in percentage of normal was obtained by using a composite curve, constructed by determining the clotting time and prothrombin ratio in diluted or adsorbed plasma. In 1936 Warner, Brinkhous and Smith[9] introduced the two-stage titration method, involving the preliminary conversion of prothrombin to thrombin in defibrinated plasma, with subsequent serial dilution and incubation before addition of standardized fibrinogen. Dam and Glavind,[10] using the principle proposed by Fischer,[11] determine coagulability by comparing the amount of thromboplastin required to clot the unknown heparinized plasma in a standard time interval with that required by normal plasma. Recently Ziffren, Owen, Hoffman and Smith[12] have proposed a bedside test of clotting activity. In this test, which is now under study, the clotting time of freshly drawn blood is determined after immediate addition of thromboplastin, no anticoagulant being used. The clotting time of control normal blood is similarly determined, and the clotting activity of the unknown is expressed as percentage of normal.

Of these tests probably only the two-stage method of Warner, Brinkhous and Smith can be said to measure prothrombin concentration. The other methods measure "not prothrombin alone, but the summation of several variables."[12] Such nonspecific measurements of clotting activity, however, may be of considerable clinical usefulness in controlling vitamin K therapy, even if unsuitable for investigative purposes.

The two-stage measurement of prothrombin concentration according to Warner, Brinkhous and Smith may be briefly described as follows: Oxalated plasma is defibrinated by addition of purified thrombin solution and allowed to stand thirty minutes for inactivation of excess thrombin. Varying dilutions are then incubated for varying intervals with standardized thromboplastin, calcium chloride and acacia solutions. Fibrinogen is then added and the clotting time is determined. A normal control is titrated in the same way. The results may be expressed in percentage of normal, or in terms of arbitrary units of prothrombin depending on the dilution's yielding a clotting mixture fifteen seconds after optimal incubation. Physicochemical factors which must be controlled in the determination are temperature, pH, dilution, electrolyte concentration and colloid concentration. As is apparent, the method is based on the existence of a quantitative relation between prothrombin concentration and clotting time under set conditions.

Experimental data bearing on the determination of prothrombin by the two-stage technic will now be presented.

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In Chart 1 is shown the effect of varying the incubation period of the mixture of prothrombin, calcium chloride and thromboplastin before the addition of fibrinogen, all other factors

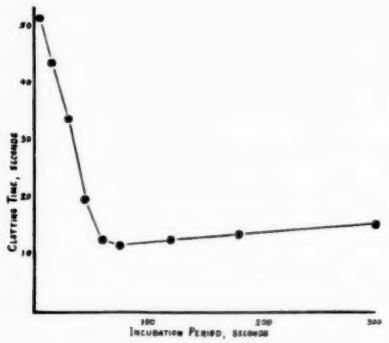

CHART 1. *Effect of Varying Incubation Period on Thrombin Formation at 82.0°F.*

being kept constant. The rapidity of clotting increases sharply until an optimal incubation period, in this experiment seventy seconds, is reached. Longer incubation diminishes the yield of thrombin through inactivation. The importance of controlling the incubation period is evident.

In the experiment from which data shown in Chart 2 were secured the relation between prothrombin concentration and clotting time under standard conditions was studied. Normal oxalated plasma was defibrinated by means of thrombin solution and divided into two portions. From one the prothrombin was adsorbed by magnesium hydroxide, the pH being subsequently adjusted to 7.4 with phenol red as indicator.[13] By mixing the two fluids in varying proportions prothrombin concentrations from 10 to 100 per cent were obtained, the other factors being unchanged. The clotting time for each dilution was determined under the usual standard conditions. Curves A1 and A2 are experimental curves constructed with data so obtained, while curve B is a composite of nine such curves. Mathematically, curve B is found

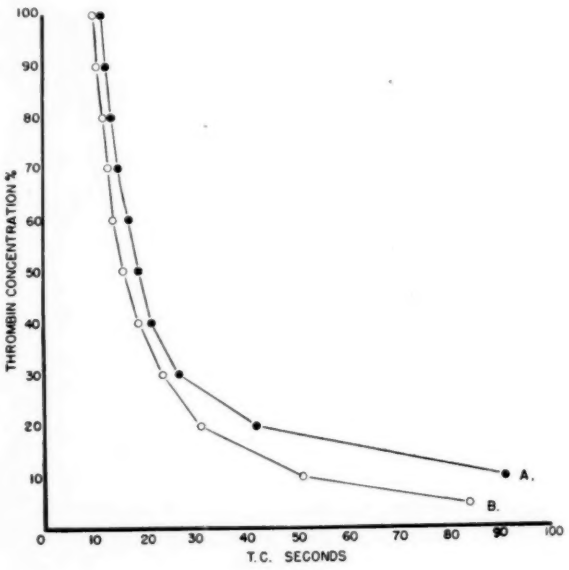

CHART 3. *Thrombin–Fibrinogen Reaction at 79.0°F.*

This shows the effect of varying the thrombin concentration. Curve A: *experimental. Curve* B: *theoretical.*

to be a power curve with the type formula, $y = kx^{-n}$, and on inserting values the formula becomes $y = 26352\ x^{-1.411}$. It is clear that a simple linear relation between prothrombin concentration and clotting time does not exist under the conditions of the experiment, the incubation period of the mixture being kept constant.

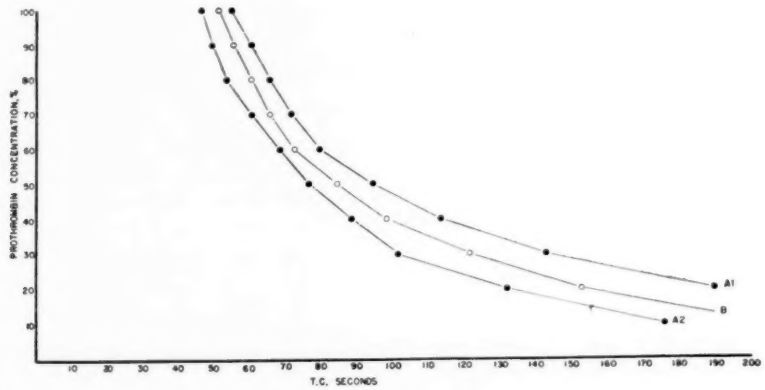

CHART 2. *Relation between Prothrombin Concentration and Clotting Time.*

Curve A1: *incubation period 5 seconds at 84.4°F. Curve* A2: *incubation period 45 seconds at 85.0°F. Curve* B: *composite* ($y=26352x^{-1.411}$).

In the experiment on which Chart 3 is based the relation between clotting time and thrombin

concentration was studied in a different way. A standard highly active purified thrombin solution,[14] containing 1 mg. of thrombin in 4 cc. of 0.9 per cent sodium chloride solution, was diluted with 0.9 per cent sodium chloride solution so as to give thrombin concentrations from 10 to 100 per cent, in terms of the original solution. The clotting time of normal oxalated plasma was then determined, using a standard volume of each of the thrombin solutions. Other conditions a normal control are determined under standard identical conditions of dilution and incubation before addition of fibrinogen. The control value is taken as 100 per cent and determines the curve to be used in reading off on the ordinate scale the prothrombin percentage for the unknown. The same results can be obtained by substituting values in the parent equation and solving for y and k.

Prothrombin values found in the study of normal and abnormal individuals will now be presented.

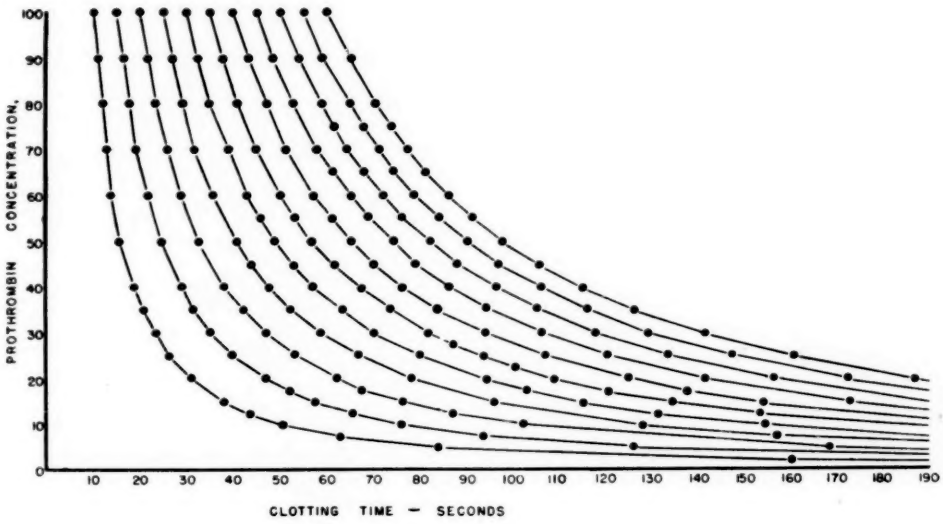

CHART 4. *Theoretical Curves Giving the Quantitative Relations between Prothrombin Concentration and Clotting Time.*

were kept constant. Curve A was constructed with data so obtained. Curve B was calculated by means of the formula previously shown in Chart 2, a slightly different interval being used in the calculation so as not to obscure the comparison.

In Chart 4 is shown a series of theoretical curves calculated for various intervals using the power formula derived from composite curve (B) in Chart 2. Such a chart is of use in prothrombin determination according to the two-stage technic as follows: The clotting times of the unknown and

TABLE 1. *Constancy of Level of Plasma Prothrombin in Same Normal Control (R. M. G.). Not Fasting.*

DATE	Vc	TEMPERATURE	PLASMA PROTHROMBIN
	%	(°F.)	%
12/7	42.2	Room	98.1
12/10	42.6	Room	99.8
12/14	45.5	Room	98.1
12/16	43.2	Room	98.1
12/23	42.6	77.0	101.6
12/29	42.9	78.8	98.1
12/31	42.9	81.0	104.1
1/2	41.8	82.4	102.5

Vc (in this and subsequent tables): red-cell hematocrit.

In Table 2 are set forth data bearing on the constancy of plasma prothrombin in a normal person over a period of time. The values are expressed in percentage of the average, and show a variation of 6 per cent during the period of study. In Table 2 is shown the extent of variation in plasma prothrombin in a group of healthy young adults, studied in the same morning. In the last column are shown prothrombin values in the same samples of plasma after standing twenty-four hours at 41.0°F.; the reduction in prothrombin averaged 23.5 per cent.

TABLE 2. *Plasma Prothrombin in Normal Adults.*

CASE	SEX	Vc	PLASMA PROTHROMBIN	
			IMMEDIATE	AFTER STANDING 24 HR.
		%	%	%
			(1)	(2)
J. S.	M	48.4	98.0	73.0
B. M.	M	50.0	96.5	71.4
E. P.	F	45.7	99.2	72.7
R. M.	F	43.7	97.9	78.4
G. R.	F	45.7	102.0	82.3
A. L.	M	46.6	99.1	78.8
R. A.	M	51.1	100.3	71.9

Table 3 shows prothrombin and red-cell hematocrit values in 6 patients with obstructive jaundice at the time of pathologic bleeding. In no case had there been adequate treatment with the mixture of vitamin K and cholic acid, and in every case the prothrombin concentration was less than 40 per cent of normal. In a case of neglected obstructive jaundice not included in the table a prothrombin value of 9.8 per cent was found at the time of active pathologic bleeding, the lowest value we have seen. It is in these cases that vitamin K–cholic acid therapy is of dramatic and life-saving effect, as the bleeding can be controlled within a few hours.

TABLE 3. *Massive Hemorrhage Due to Prothrombin Deficiency in Obstructive Jaundice (No Previous Treatment with Vitamin K or Inadequate Treatment).*

	Site of Bleeding	Vc	Plasma Prothrombin
		%	%
T. P. H.	Urinary and biliary tracts	28.5	26.0
J. R. B.	Gastrointestinal tract	23.0	13.0
M. L. K.	Endometrium, nasopharynx	46.9	25.0
H. C. K.	Gastrointestinal tract	30.5	36.5
R. G.	Nasopharynx, mouth, gums	37.5	24.1
M. Y.	Gastrointestinal tract	34.9	31.5

Chart 5 illustrates the typical preoperative response of prothrombin concentration to vitamin K–cholic acid therapy. For two months the patient had been severely jaundiced from carcinoma of the head of the pancreas. Such patients should receive proper amounts of vitamin K and bile salts for three to five days before operation and for five to ten days after operation. Prothrombin determinations are carried out every two or three days in order to control this specific therapy.

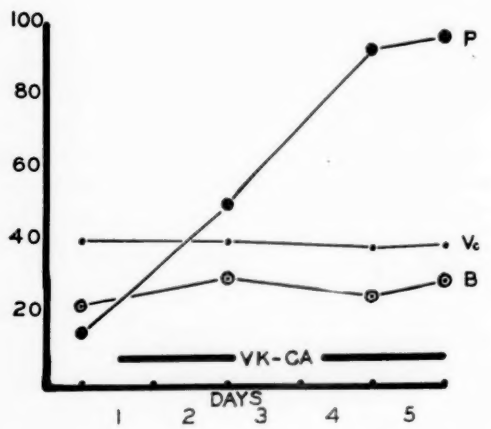

CHART 5. *Preoperative Prothrombin Response to Vitamin K Therapy in a Case (E.G.B.) of Obstructive Jaundice.*

P: *prothrombin in per cent of normal.* Vc: *hematocrit in per cent.* B: *plasma bilirubin in mg. per 100 cc.* VK-CA: *time of administration of a mixture of vitamin K and cholic acid.*

That abnormal bleeding may occur in such diseases as thrombocytopenic purpura and hemophilia without prothrombin deficiency is brought out in Table 4. Vitamin K therapy would not be indicated in these cases.

In Table 5 are listed prothrombin values in patients with miscellaneous diseases. Reduction in prothrombin may occur in various conditions, such as chronic sepsis, malnutrition and avitaminosis, chronic loss of blood, cirrhosis of the liver, chronic peptic ulcer and cachexia of malignant disease. As a rule the reduction is moderate and probably not of symptomatic importance. However, under further depressing circumstances, such as loss of blood, infection and surgical operation, conceivably the prothrombin concentration might be further reduced to the point of disabling the clotting mechanism. The usefulness of vitamin K therapy in this group of cases is an interesting field for study. Broadly considered, hemorrhage depends on two factors, extent of tissue injury and effectiveness of the complex coagulative mechanism. When the power to form an effective clot is lowered, bleeding occurs with mild or even

TABLE 4. *Abnormal Bleeding Not Due to Prothrombin Deficiency.*

	Diagnosis	Site of Bleeding	Vc	Plasma Prothrombin
			%	%
A. S.	Hemophilia	Arm, laceration	26.2	98.0
C. S.	Hemophilia	Spinal cord	40.6	86.8
R. S.	Hemophilia	Thigh	38.5	85.4
L. F.	Aplastic anemia	Mouth, skin	22.2	103.5
R. O.	Thrombocytopenic purpura	Mouth, skin	36.4	94.1
C. L.	Thrombocytopenic purpura	Nasopharynx, skin	43.3	84.6
A. K.	Polycythemia vera	Biopsy wound	70.9	108.4
F. K.	Retinal hemorrhage	Retina	50.0	96.2
R. R.	Retinal hemorrhage	Retina	43.7	102.4

TABLE 5. *Plasma Prothrombin in Various Diseases.*

	Diagnosis	Vc	Plasma Prothrombin
		%	%
T. M.	Alcoholic cirrhosis	42.5	69.3
D. R. S.	Chronic ulcerative colitis	27.6	79.1
H. E. M.	Chronic ulcerative colitis	30.7	86.9
O. M. S.	Chronic lung abscess	35.9	61.1
E. K.	Cancer of the rectum, malnutrition	31.2	77.4
J. J.	Catarrhal jaundice	44.6	82.4
R. S.	Catarrhal jaundice	41.7	77.6
H. B. C.	Catarrhal jaundice, gastric ulcer	40.9	83.6
M. J. C.	Catarrhal jaundice, pulmonary tuberculosis	34.6	66.9
E. M.	Catarrhal jaundice	48.5	75.1
J. K.	Catarrhal jaundice	51.5	74.6
J. F.	Catarrhal jaundice	49.2	87.8
E. B.	Chronic duodenal ulcer	39.2	81.1
A. C. H.	Melanoma of neck	41.4	76.1
J. N.	Gastrojejunal ulcer	32.8	73.9
K. W.	Toxic thyroid (postoperative), avitaminosis	35.9	84.4

trivial injury. From this point of view, it would seem desirable to maintain plasma prothrombin concentration as nearly normal as possible in patients with lesions exposed to trauma and likely to bleed, such as peptic ulcer, esophageal varices, chronic ulcerative colitis, pulmonary tuberculosis and lung abscess.

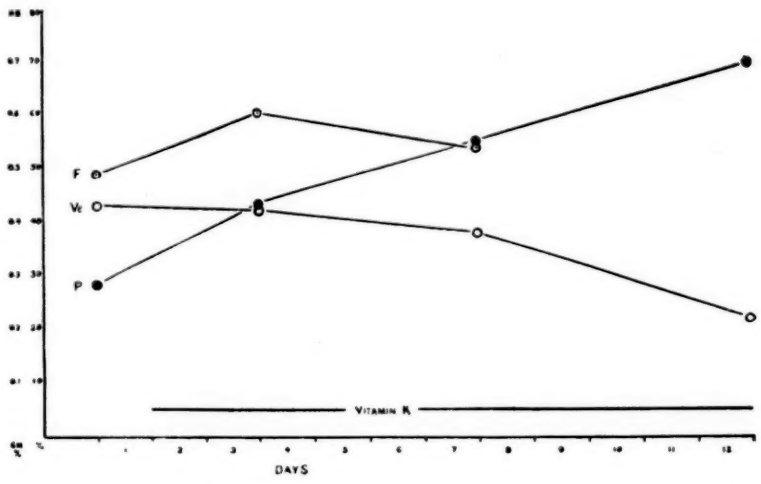

CHART 6. *Effect of Vitamin K on Plasma Prothrombin in a Case (S.J.) of Chronic Ulcerative Colitis.*

P: *prothrombin in per cent of normal.* F: *fibrinogen in gm. per 100 cc.* Vc: *hematocrit in per cent.* VITAMIN K: *time of administration of a mixture of vitamin K and cholic acid.*

In Chart 6 is shown the elevation in prothrombin level occurring after administration of vitamin K–cholic acid mixture to a patient with chronic ulcerative colitis. With the rise in prothrombin concentration a distinct decrease in bleeding from the colon occurred.

SUMMARY

Prothrombin levels can be accurately and practicably determined.

In the normal individual, prothrombin concentration fluctuates but little.

In obstructive jaundice, the prothrombin level may be dangerously reduced; a vitamin K–cholic acid mixture taken by mouth is dramatically effective in restoring it to normal.

In such hemorrhagic states as hemophilia, aplastic anemia and thrombocytopenic purpura, the prothrombin concentration is not reduced and vitamin K therapy is not indicated.

The prothrombin level may be reduced in a variety of diseases, such as chronic infection, peptic ulcer, cirrhosis of the liver, chronic ulcerative colitis, malnutrition and cachexia; vitamin K therapy may be of value in these conditions, but further study of the question is needed.

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THE USE OF COBRA VENOM IN THE RELIEF OF INTRACTABLE PAIN*

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IN 1929 Dr. Adolphe Monaelesser of New York City was told of a Cuban leper who was relieved of severe pain in his arm after having been bitten by a poisonous tropical spider. This episode led Monaelesser to suggest to Calmette, of the Pasteur Institute, that some animal poisons might be of value for the relief of intractable pain, and the former, together with two French physicians, began such a study, selecting the venom of the cobra because of its richness in neurotoxins. Ultimately, from this work, the Pasteur Institute[1] reported on the use of small and safe dosages of the venom in the relief of severe pain, particularly in cases of terminal cancer. This work has been clinically tested and widely accepted on the Continent, but it was not until 1935 that Macht[2] in this country began to write of its use. He has fully investigated the pharmacology and toxicology of cobra venom, has prepared and assayed a safe and sterile solution for therapeutic human use and has reported[3] a series of 200 cases of severe pain treated with this drug.

Because the care of the patient with advanced cancer is so perplexing a problem, particularly for patients who cannot afford institutional care or for whom opportunities to obtain it are lacking, this seemed an ideal treatment. We are only too familiar with the problem of a pain-wracked patient in a home where loving care cannot compensate for constant pain, and where the family physician cannot administer opiates every three hours by the clock.

MODE OF ACTION

The venom of various members of the cobra species was tried by Macht, being transported in the form of dried scales. The active principle of the many venoms was the same, although its chemical nature is still in doubt, and seemed to be a "neurotoxin." Macht[4] investigated the common belief about the action of the venom. It had been thought that the numbing and paralysis of a human member struck by the cobra was due to a local anesthetic effect. Macht experimentally showed this to be due to the protoplasmic poisoning action of overwhelming amounts of the venom concentrated in one place. When minute quantities were used therapeutically in very dilute concentrations, there was no demonstrable local anesthetic action. Instead, all his data suggested that the action was due to a central analgesia, specifically in the pain areas of the cerebrum, much as is the action of opium and its alkaloids, chiefly morphine.

It was also demonstrated that cobra venom and the opium alkaloids differed in "the fourth dimension of pharmacodynamics," as Macht[5] calls the time element involved in all pharmacologic action. As is commonly known, morphine exerts its analgesic influence within a very short time, usually beginning in ten to twenty minutes, and its action persists for several hours. Venom manifests its action much more slowly, as will be seen in this series of cases (Cases 4 and 11) as well as in Macht's[3] series. Daily injections of the venom for at least two days and usually three or four are required before the full effect becomes apparent. Even then, some of the patients report partial relief at the end of the first week, only to have complete relief as late as three weeks after the injections were started (Case 12). Once induced, the analgesia persists much longer than in the case of morphine.[6] In this series, the action lasted for two, three and sometimes four days (Cases 1 and 11).

One may liken the action of cobra venom to that of digitalis. The patient undergoes a period of saturation for three or four days. After this the maintenance dose is dictated by the physiologic needs of the patient, that is, the amount and character of the pain. Some patients require several injections daily, whereas others need only one injection in two or three days. This matter is one of individual requirement, just as digitalis is adjusted to the individual cardiac patient.

Cicardo[7] suggests a probable increase in the pain threshold of the peripheral nerve mechanism. Clinically, there also seems to be an anticonvulsant property of the venom, as seen in cases of acute Parkinsonism with painful contractures.[8] There is one other property which may be secondary to the relief of pain — a distinct improvement in the psychiatric outlook is characteristic. Certain it is that patients maintain their courage, as well as their nutrition, under this regime much better than under the opiates or barbiturates.

To date there has been no evidence of addic-

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tion or of increased tolerance to the drug. It can be stopped and started at will, the dose may be decreased or increased as the occasion requires. In this series, once the maintenance dose was found it was easier to give supplementary medication of some of the quick-acting analgesics for temporary increase of pain, such as that due to sudden emotional crises, intercurrent infections or surgical procedures attempted during this period. This series has been followed for only four months, but it has been the experience of the early investigators[3, 7, 9] that there is no increased tolerance after months or even several years of administration of the drug. The cases in this series are almost all those of terminal cancer, and 3 deaths have already occurred, so that duration is of necessity shorter than that in a series of so-called chronic diseases. We have not been fortunate enough to have any cases of morphine addiction to treat, although such have been reported.[3] The transition is said to be quite easy and without any of the usual withdrawal symptoms. This we have not verified.

FORM OF ADMINISTRATION AND DOSAGE

Cobra venom is distributed in 1-cc. glass ampules containing 5 mouse units of cobra venom. A mouse unit is defined as that quantity of cobra venom solution required to kill a 22-gm. white mouse within eighteen hours after intraperitoneal injection. This dose is eminently safe. In this series, despite much larger doses, not a single side reaction or untoward reaction was encountered which could be ascribed to the venom.

It is important that the drug be given intramuscularly, for if it is given subcutaneously it will cause some local redness and tenderness for several days. There may be local tenderness when it is given intramuscularly, but this disappears after the first few weeks of injection.

At the beginning of the series, treatment was started, as suggested by Macht,[3] with an injection of 0.5 cc. (2½ mouse units), followed by daily injections of 1.0 cc. (5 mouse units).* Continental therapeutists give much larger doses.[10] After we became familiar with the drug, we endeavored to adjust the initial dose to the requirements of the patient, beginning in some cases with 2.0 or 3.0 cc. (10 or 15 mouse units), and continuing the dosage at that level for four to six days or until complete relief was obtained, then considerably lowering the dose to a maintenance level. No untoward reactions were encountered. Whether the treatment was started with a large or with a small dose, the time of the appearance of relief seemed to be the same, usually the third or fourth day after administration had been begun. The usual maintenance dosage was 1.0 cc. (5 mouse units) every day or every other day.

Because most of our patients were outpatient cases, and because of the difficulty of home visits for the injections, they were brought into the hospital for an average stay of one week, during which time they were saturated with the drug and their maintenance dose was tentatively determined. The cases were followed at two- or three-week intervals through the Outpatient Department, and dosage was regulated by symptoms. The patients were encouraged to learn to give themselves the injections, just as diabetic patients administer their own insulin, and most of them were able to do so. They were also encouraged to adjust their own dosage as their requirements demanded. This they did well.

CLINICAL EXPERIENCE

Altogether, 17 cases were treated in this series. We have endeavored to present all the essential facts concerning pathology and treatment. Pain is at best a subjective factor which is most difficult to measure by any one standard. We tried to relieve pain, although effort to cure the fundamental disorders was carried on at the same time. The patients were told only that they were to get injections of a serum which might help their pain. Daily they were asked to estimate the amount of their pain, and scrupulous effort to avoid any form of suggestion was observed. In the patients with severe pain, during the period before the venom began its action, we thought it kinder to keep them free from pain by the usual methods, but estimated their relief by the diminishing amount of the analgesics which they required.

CASE REPORTS

Case 1 *(F.H.W. 36418)*. Mrs. C., a 47-year-old housewife, 3 years before admission, had had a Wertheim operation for carcinoma of the cervical stump following x-ray and radium treatment. She required bilateral ureterostomy, and ultimately one kidney was removed for chronic infection. She had an indwelling ureteral catheter in her remaining ureter, and had chronic infection in that ureter and the kidney pelvis. The presenting complaint was severe, colicky ureteral pain from mechanical irritation of the catheter whenever she moved, plus the chronic infection in the kidney. On entry the patient was able only to lie rigidly in bed without movement in order to prevent ureteral spasm. Previous medication included luminal, codeine and aspirin, up to every hour, without relief. Cobra venom treatment was begun with ½ ampule the 1st day and 1 ampule thereafter. On the 2nd day the patient noted a real improvement. On the 4th day she was almost pain free. After the 5th day she was given 2 ampules daily and was completely relieved of pain. She was able to sleep the whole night through in any

*The cobra venom was furnished through the courtesy of Dr. David I. Macht, of Baltimore, and of Hynson, Westcott and Dunning, of that city.

position, make her bed and walk three blocks. She was discharged on the 8th day on 1 ampule every other day, without other medication.

The patient was followed at 2-week intervals for 4 months. She did a half-day's housework, walked with swinging arms and once danced. On 1 ampule every other day she was entirely comfortable, but with longer intervals some of the pain returned. She gained 13 pounds.

Case 2 *(F.H.W. 27729)*. Mrs. H., a 64-year-old American housewife, entered the hospital in 1937 for treatment of severe interstitial cystitis (Hunner's ulcer). She complained of constant burning pain, suprapubic when the bladder was full, deep in the pelvis when it was empty. She voided every 15 minutes during the day, every hour during the night, and was utterly miserable, with no relief on any medication. The bladder capacity varied from 150 to 200 cc., with symptoms relieved for a short time if the bladder was dilated under anesthesia. Cobra venom was given, ½ ampule the 1st day and 1 ampule daily thereafter. On the 4th day she estimated that 75 per cent of her pain had gone. On discharge on the 8th day, no greater relief was experienced; this degree of relief was maintained on 1 ampule every other day. The bladder capacity was unchanged.

The patient was seen at 2-week intervals for 4 months. She was able to sleep 3 hours at a stretch at night, had some pain deep in the pelvis, but it was 60 per cent less than before. She could do half a day's work without difficulty, and walked for 30 minutes without discomfort. She voided only once in 1½ hours. The bladder capacity remained unchanged, although she was routinely dilated to maintain her capacity. When asked whether she wished to discontinue the venom she vigorously refused. Increasing the dose had no additional effect.

Case 3 *(F.H.W. 28613)*. Mrs. S., a 58-year-old, American housewife, entered the hospital in 1937 for treatment of severe interstitial cystitis of 2 years' duration. She complained of constant deep pelvic pain, and severe suprapubic pain when the bladder was full. She voided every 15 or 20 minutes during the day and five or six times at night, and slept no more than an hour at a time. Stepping up on a curb caused a severe spasm of pain which doubled her up, and forced her to sit still for 5 minutes. She had tried codeine, barbiturates and salicylates, all without relief. Cobra venom was started with ½ ampule the 1st day and 1 ampule daily thereafter. The patient was discharged on the 8th hospital day on 1 ampule every other day. The bladder capacity was still around 220 cc. On the 4th day after discharge the patient felt relieved of 80 per cent of her pain, slept 4 hours at a stretch at night and voided one or two times at night, and every 1½ hours during the day. She could walk vigorously with swinging arms, and step up on curbstones without difficulty.

In a 2-week follow-up her progress was maintained on 1 ampule every other day. A 4-week follow-up and subsequent ones up to 4 months showed that she was only 60 per cent relieved but was doing some work about the house. The bladder capacity was steadily diminishing, and frequent dilatations under anesthesia were done. Increasing the dose of cobra venom seemed to give no additional relief. She refused to discontinue the injections.

Case 4 *(F.H.W. 29432)*. Mrs. L., a 36-year-old, Negro housewife, 1 year before admission had surgical extirpation of a papillary cystadenoma of the ovary with subsequent deep radiation. She entered the hospital with ascites from carcinomatosis, with the liver down to the iliac crest and with multiple areas of subacute intestinal obstruction. She had a constant, agonizing low backache, spasms of bowel colic, intermittent vomiting and constipation. Previous medication had included codeine and aspirin every 2 or 3 hours at home. She was bedridden at home from weakness and cachexia. Cobra venom was started on 1 ampule daily, which was continued for the 10 days of her hospital stay. After the 3rd day she required no other medication. Daily enemas, mineral oil, belladonna and a low-residue diet relieved much of her bowel symptomatology. On the 5th day the patient sat up and walked a little thereafter, but with difficulty. She was discharged on the 10th day on 1 ampule every other day.

She had no pain except some dull abdominal cramps at the worst of her attacks. The patient died at home of complete intestinal obstruction in the 4th week of treatment.

Case 5 *(F.H.W. 29603)*. Mrs. B., a 49-year-old, Negro housewife, 1 year before admission had radium and x-radiation for carcinoma of the cervix. No surgery was undertaken; the pelvis was solid with carcinoma. She complained of anorexia, intermittent vomiting, constant low back pain and constipation and was bedridden. Previous medication had consisted of codeine and aspirin, four to twelve times daily, without complete relief. Cobra venom treatment was begun with 1 ampule daily for 2 days, then 2 ampules daily for 3 days, thereafter 1 ampule daily. The patient was discharged on the 8th hospital day with 40 or 50 per cent of the pain relieved.

At home she soon returned to codeine, still without complete relief of pain. On some days relief was complete, while on others no amount of any medication would give complete relief.

The patient re-entered the hospital 3 weeks after her discharge. Intrathecal alcohol injection was performed with complete relief of pain, but the patient lapsed into coma on the 4th day and died of uremia from ureteral obstruction and pelvic peritonitis due to malignant perforation into the bladder and rectum.

Case 6 *(F.H.W. 28753)*. Mrs. C., a 48-year-old, Italian housewife, had radium and x-radiation for carcinoma of the cervix 1 year before admission. She entered the hospital complaining of constant strangury, steady pain in the low back, pain running down the right leg on both sides and down the inside of the left leg and burning vulvar pain. She was anorexic and barely able to walk. The pelvis was completely frozen with carcinoma, which had also invaded the floor of the bladder, the anterior vaginal wall and the left labium. Previous medication had been dictated by the family physician and included codeine, aspirin and morphine, without complete relief unless the patient was rendered comatose. Cobra venom treatment was started with 1 ampule daily for 2 days, then 2 ampules daily for 7 days. On the 5th day the patient was relieved of back pain and pain in the legs. The urinary symptoms were unchanged. She could sit in a chair to eat, but walked no more than before. She was discharged on the 9th day on 1 ampule every other day.

At 2-week and 4-week follow-ups the patient was completely free of pain during the day, but required phenobarbital for sleep at night.

She re-entered the hospital the 5th week after discharge for intrathecal alcohol injection because of dissatisfaction with injections and increasing pain at night. Complete relief from alcohol injection was obtained. She estimated that 50 per cent of her pain had been relieved on venom alone.

Case 7 *(F.H.W. 27740)*. Mrs. B., a 48-year-old, Swedish housewife, entered the hospital in 1937 for treatment of carcinoma of the ovary. Surgery and x-radiation were performed. She was treated at home, at which time she had extensive pelvic metastases, constant rectal tenesmus and constant low back pain. She was fairly comfortable on powdered opium given four or six times daily. Cobra venom treatment was started with ½ ampule the 1st day, then 1 ampule daily for 7 days, then 2 ampules daily for 4 days. The patient was continued on 2 ampules twice weekly for four more doses. Because the patient experienced only 30 per cent relief of pain, and because the powdered opium exerted its influence on the constant rectal tenesmus as well as on the pain, cobra venom was discontinued.

Case 8 *(F.H.W. 24367)*. Mrs. M., a 60-year-old, American housewife, first began treatment 5 years before admission for interstitial cystitis with moderately severe suprapubic, vaginal and deep pelvic pain. This prevented all but a bed-chair life, with no permanent relief on codeine or barbiturates. Cobra venom treatment was started on 1 ampule daily, and continued at that dosage for 8 days, when the patient was discharged on 1 ampule every 3rd day.

Relief from pain was complete. If the patient went without the venom for more than 3 days, some of the old pain recurred. She walked without difficulty and was doing some light housework. The initial bladder capacity was between 300 and 350 cc., and there was no change under treatment. She was dilated routinely in order to give relief from urinary frequency. The patient has been followed for 3 months, and her freedom from pain has continued.

Case 9 *(F.H.W. 24457)*. Mrs. R., a 74-year-old, American housewife, 4 years before admission had had a hysterectomy and radium therapy for carcinoma of the uterine fundus. In 1938 she had carcinoma of the bladder, treated by x-radiation and implantation of radon seeds. She entered the hospital complaining of constant, deep, burning pain in the pelvis, with strangury, frequency, incontinence and loss of 20 pounds in weight. Previous medication was codeine and aspirin four to six times daily, without complete relief from pain. The patient was bedridden. Cobra venom treatment was started with 1 ampule daily for 7 days. On the 6th day she was pain-free and able to sit up and walk a little. She was discharged on the 8th day on 1 ampule every other day.

In the 5th week of treatment the patient lapsed into uremia and died. She had been completely free of pain until death.

Case 10 *(F.H.W. 22915)*. Mrs. J., a 51-year-old Negro housewife, had a vulvectomy and bilateral groin dissection for carcinoma of the vulva 6 years before admission. Recurrence in 1938 was treated by local radium application, following which the patient developed a painful ulcer of the perineum between the rectum and the vagina. She complained of constant vulvar and perineal burning "like a hot poker pressed in her crotch," requiring codeine and aspirin every 3 or 4 hours. She could not sit or walk, and was almost completely bedridden. Cobra venom treatment was started on 1 ampule daily. Nupercaine packs on the perineal ulcer gave great relief. From the 3rd to the 6th day the patient had 2 ampules daily. On the 7th day nupercaine packs were omitted and all other medication except ½ gr. of codeine some time during the day. She was discharged on the 13th day on no other medication, able to sit in a chair all day and to walk for 5 or 10 minutes. Her nutrition and spirits were definitely improved.

Two-, 4- and 6-week follow-ups showed relief maintained on 1 ampule every other day.

Case 11 *(F.H.W. 27028)*. Mrs. P., a 49-year-old, American housewife, was treated with radium and x-radiation for carcinoma of the cervix 2 years before admission. She entered the hospital complaining of nausea, pain and occasional vomiting. Pain was particularly severe in the left groin, radiating down the leg. A loss of 30 pounds in weight was noted. Previous medication was 30 or 40 gr. of aspirin daily and 6 to 12 gr. of Nembutal at night for 9 months. The patient was admitted with all the symptoms of salicylate poisoning. Cobra venom treatment was started with 1 ampule daily. On the 5th day relief from pain was complete, and the patient could feel "a blanket over the pain with occasional darts of pain coming up through it." Some phenobarbital was required for sleep at night. She was discharged on the 8th hospital day free of pain, on 1 ampule every other day.

The follow-up at 4 weeks showed a weight gain of 7 pounds, and the patient was walking easily with slight weakness of the left leg. If the injection was missed, the patient noted recurrence of some pain on the 2nd day afterward. No other medication was used.

Case 12 *(F.H.W. 25282)*. Mrs. V., a 43-year-old, Italian housewife, 3 years before admission had had radium and x-radiation for carcinoma of the cervix. In 1938 she had had x-radiation to metastatic carcinoma in the apex of the right lung, with cervical and axillary nodes and a unilateral Horner's syndrome. She entered the hospital complaining of severe, constant pain in the right arm, shoulder, chest and back, with partial paralysis of the right arm, sensory and motor changes and disuse atrophy. No relief had been experienced on codeine, plus 1/4 gr. of morphine three or four times daily, given by the family physician. In the hospital the patient required 2 to 4 gr. of Pantopon daily, and even when stuporous lay groaning with pain. Cobra venom treatment was started with 2 ampules daily for 4 days, and then 3 ampules daily. The patient was discharged on the 8th hospital day 75 per cent relieved.

A 2-week follow-up revealed that she needed no supplementary medication on 3 ampules daily, but did on only 2 daily. A 4-week follow-up showed no change, but the patient was rapidly failing. This was not a case of addiction to opium derivatives.

Case 13 *(F.H.W. 30316)*. Mrs. M., a 43-year-old, American housewife, had had a carcinoma of the cervix treated by x-radiation and radium 4 months before admission. Widespread broad ligament extension persisted. She entered complaining of constant low backache, pain radiating down the inside of the right leg as well as outside, and severe bladder spasm. The bladder spasm was relieved by dilating ureters and bladder, but the pain was not affected. Previous medication included barbiturates, aspirin, and up to 2 gr. of morphine daily, injected hypodermically by the family physician. This patient was extremely difficult to evaluate because she had previously learned that she had carcinoma and her psychic equilibrium was most unstable. Cobra venom treatment was started with 2 ampules daily for the first 2 days, then 3 daily for the next 3 days. The patient was discharged on the 7th day on 2 ampules daily, relieved of 75 per cent of her pain.

At home she was subjected to a series of emotional shocks and the venom was discontinued. She was again placed

under hypodermic morphine injections by the family physician, awaiting alcohol injection. The result of treatment in this patient cannot be evaluated.

CASE 14 *(private case)*. Miss S., a 37-year-old governess, 14 months before admission had had a radical mastectomy followed by local x-radiation for carcinoma of the breast. Four months before entry she had complained of chest and axillary pain, pain in the lower back radiating down the legs, pain in the pelvis and inability to walk. She was given a course of x-radiation of the pelvis and spine without change in the picture. Previous medication consisted of codeine and aspirin, which the patient was loath to take despite pain. Cobra venom treatment was started on 3 ampules daily and was continued at that level for 7 days. On the 4th day the patient was 40 per cent relieved. On the 5th day she was 70 per cent relieved. On discharge on the 7th day she was completely relieved and able to bend and to walk.

She continued to take 1 ampule daily with continued relief, although she could not resume her work.

CASE 15 *(F.H.W. 27878)*. Mrs. D., a 56-year-old, American housewife, 9 months before admission had had a radical mastectomy and x-radiation for carcinoma of the breast. She had been complaining of "arthritis" for the 2 months previous to entry, when she re-entered for an x-ray check-up for metastatic disease and control of pain. She had extensive bone metastases of the skull, cervical and lumbar spines and pelvis, with difficulty in swallowing, constant back pain and inability to walk. Cobra venom treatment was begun with 2 ampules daily, but additional medication was required for sleep at night. After a week of cobra venom the patient had no pain but was unable to sleep, for which she was given supplementary medication. Injections were discontinued because the patient was rapidly failing. She was transferred to a hospital near her home.

CASE 16 *(F.H.W. 30694)*. Miss M., a 57-year-old stenographer, entered the hospital with a 1-year history of constant hematuria, low pelvic pain and frequency of every 15 or 20 minutes day and night. Carcinoma of the bladder was treated with two courses of x-radiation without appreciable regression of the tumor. Previous medication had been confined to the salicylates, without relief. Cobra venom treatment was started with 2 ampules daily. On the 3rd day 75 per cent of the pain was relieved. On the 5th day she was completely relieved of pain. The patient was discharged on the 8th day.

The maintenance dose was 1 ampule every other day. The patient was voiding only every 1 or 2 hours at night and day, with no pain.

CASE 17 *(private case)*. Mrs. M., a 41-year-old, American housewife, was treated with radium and x-radiation elsewhere for carcinoma of the cervix. She entered the hospital complaining of constant low backache, pain in both legs, constant lower abdominal pain with cramps and inability to walk on account of pain. The pelvis was solid with carcinoma. Previous medication included codeine, the salicylates and morphine, administered by the family physician. Cobra venom treatment was started with 3 ampules and was continued for 7 days. On the 5th day she was able to dispense with all medication except bromides twice daily. On the 6th day 80 per cent of the pain was relieved. On the 8th day the patient was discharged on 1 ampule daily.

She was quite comfortable thereafter with small amounts of supplementary medication, and was up and out of bed, walking with some difficulty. Her mental outlook had been markedly improved.

DISCUSSION

As will be seen from Table 2, the percentage of complete relief compares favorably with the figures given by Kirschen,[9] Saenz[11] and Macht,[3] who quote much larger series in which about 70 per cent of the patients showed definite relief of pain, 10 per cent slight relief and 20 per cent were not affected. In this series, 8 of the 17 patients (46 per cent) considered themselves completely relieved. Four of the group (24 per cent) estimated their relief at from 75 to 95 per cent. Three (18 per cent) estimated their relief as from 50 to 75 per cent. Only 2 cases fell below 50 per cent relief, although 2 more of the cases who were more relieved were not continued on the venom, for other reasons. In other words, nearly 50 per cent of the patients were completely relieved of pain, and in 88 per cent the relief was 50 per cent or more.

TABLE 1. *Listing of Cases, Results and Maintenance Doses.*

CASE NO.	DIAGNOSIS	ESTIMATED IMMEDIATE RELIEF	ESTIMATED CONTINUED RELIEF	MAINTENANCE DOSE
		%	%	*ampules*
1	Ureteral spasm; chronic kidney infection (carcinoma of cervix)	100	100	1 every 2 days
2	Interstitial cystitis (Hunner's ulcer)	75	60	1 every 2 days
3	Interstitial cystitis (Hunner's ulcer)	80	60	1 every 2 days
4	Ovarian carcinomatosis; subacute intestinal obstruction	95	95	1 every 2 days
5	Carcinoma of cervix, Class D	40–50	40–50 (discontinued; alcohol injection)	1 every 2 days
6	Carcinoma of cervix, Class D	50	50 (discontinued; alcohol injection)	1 daily
7	Carcinoma of ovary (constant rectal tenesmus)	30	30 (discontinued)	1 daily
8	Interstitial cystitis (Hunner's ulcer)	100	100	1 every 3 days
9	Carcinoma of bladder	100	100	1 every 2 days
10	Carcinoma of vulva	100	100	1 every 2 days
11	Carcinoma of cervix, Class D	100	100	1 every 2 days
12	Carcinoma of cervix, Class D	75	75–100	3 daily
13	Carcinoma of cervix, Class D	75	0	2 daily
14	Carcinoma of breast	100	100	2 daily
15	Carcinoma of breast	50	50 (discontinued)	1 daily
16	Carcinoma of bladder	100	100	1 every 2 days
17	Carcinoma of cervix, Class D	80	80	1 daily

TABLE 2. *Summary of Results.*

PERCENTAGE OF RELIEF	NO. OF CASES	PER CENT
95–100	8	46
75–95	4	24
50–75	3	18
0–50	2	12

Several additional facts seem to be indicated. The response to cobra venom can be estimated after five to seven days of administration. If the pa-

tient fails to respond by the end of that period, it is unlikely that there will be any benefit. If there is a response, it usually begins on the third or fourth day of injection, despite the amount used, and is complete by the sixth or seventh day. The benefits are not likely to increase after that time, but the relief of pain is likely to continue at that level, even though the amount is reduced to a maintenance level which is determined by the patient. The large majority of patients were able to maintain their relief on 1 ampule every other day, although a few required 1 ampule a day and several required 2 or 3 a day. There were no side reactions, and there was no evidence that increasing amounts of the drug were necessary. The drug seemed to act on pain no matter what its etiology. Other investigators[12] have used the drug in the treatment of pain due to chronic arthritis, acute Parkinsonism and cardiac disease, and it has been employed for relief of pain due to arteriosclerotic gangrene of the extremities, in cases of chronic cystitis with bladder spasm and in patients with tic douloureux. These results seem to indicate that the field of use of the venom is well beyond the single problem of terminal cancer with its intractable pain.

SUMMARY

Seventeen cases are presented with their salient clinical details, and the use of cobra venom in the relief of their intractable pain is outlined.

In this small series, 46 per cent of the patients were completely relieved of pain, and 88 per cent were relieved of half of their pain or more.

In those cases in which relief is obtained, the mental outlook and general health are benefited by release from the sharp drag of constant pain. Some patients are able to return to their work and to again become wage earners. In those who are only partially helped, the drug makes an excellent basal analgesic which can be augmented by relatively non-habit-forming analgesics. This avoids the danger of morphine addiction and increasing opiate tolerance.

In those patients who are not helped, intrathecal alcohol injection or cordotomy is to be considered.

Since cobra venom can be self-administered, it makes an ideal outpatient treatment, or treatment which can easily be followed by the general practitioner in the non-hospitalized case. There is no evidenced danger of addiction, increasing tolerance or toxicity of the drug. Its cost is not prohibitive. The use of cobra venom seems to offer a real possibility of aid in the treatment of this difficult group of cases.

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PRACTICAL PSYCHOTHERAPY WITH ADOLESCENTS*

A Brief Survey of the Field for the General Practitioner

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THE general practitioner in his role of family physician still exerts a powerful influence in the family circle, with both parents and children, but especially so with the children, for they are conditioned in his favor because of the respect and faith they see their parents extend to him. Since the children have this good rapport with him, he is in an excellent position to handle their personality and behavior problems by applying certain methods which are arbitrarily termed mental hygiene. These procedures are essentially, first, a careful search for and recognition of signs and symptoms of personality disorders, and second, appropriate instruction and guidance to correct the conditions detected. The general practitioner who has been the doctor for a certain family for a number of years is usually well able, if he looks carefully and takes the time needed, to discover the beginning personality defects in the adolescents in that family. He will know if the youngster is becoming abnormally shy, introverted and sissy, and should realize that this may be the personality development of a case of dementia praecox; then it should be his duty to talk it over with the parents and the youngster separately, and evolve a daily schedule which will tend to divert the child into an extrovert type of activity, thus counteracting the tendencies to introversion; this is good practical mental hygiene. Behavior problems in the family are nearly always known to the family doctor, since the worried parent brings the child to him with the idea that "perhaps the child is ill and that is why he acts that way." In this paper there will be presented a general survey of problems met with in dealing with adolescents and a number of brief case histories to demonstrate particular problems; there will also be pointed out the frequency with which only simple guidance is needed to clear up what seems to the family and the adolescent himself an overwhelming difficulty. To supplement the work of the family doctor may be mentioned the plan of having a trained psychiatrist on call at each high school to handle personality problems among students and faculty, as well as to supervise the amount and method of sex education given in certain courses.

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PROBLEMS OF ADOLESCENCE IN GENERAL

Adjustment of the adolescent within himself includes many factors. Self-consciousness is promoted by awareness of increased bodily size and attendant clumsiness, and by the change of voice which in boys often subjects them to ridicule because of the embarrassing breaking from a bass into falsetto. Self-confidence is induced by encouraging them to make things by handicraft, particularly useful things such as tables, bookcases and shelving, repair work about the house and care of the family car. It is helpful to obtain a part-time job in a store or a newspaper route; to go with one's "gang" on hikes and educational trips; and to be away from home overnight or longer without development of appreciable homesickness. The personality type of the adolescent becomes more noticeable and we see him as the extrovert, the good mixer, or as the introvert, the solitary one who likes to keep to himself and reads a great deal. Religion becomes more objective to the adolescent as he tries to rationalize what people preach and what they actually practice, and he begins to doubt many of the so-called religious truths; he often becomes cynical or agnostic, or perhaps openly defiant concerning religion, and it is then wise to attempt only to steer him toward a rational golden-rule type of religion. The individual ambitions have usually passed through the locomotive-engineer – policeman – fireman – G-man stage into the more or less idealistic doctor–lawyer–clergyman–musician–engineer stage; he should be wisely led to consider his assets of individual ability, education, family dependence and personality type and from the sum of these try to plan a reasonable career. Sexually the adolescent has many difficulties with which to contend: curiosity, anxiety, experiences, either homosexual or heterosexual, with those of his own age or adults, masturbation, menstruation, erection and nocturnal emissions, and the evaluation by the girl of father–brother and by the boy of mother–sister ideals with what is met outside the family.

CASE 1. A 14-year-old boy was given a "lecture" on sex by his father, who was quite embarrassed at the

event but had been prompted into it by the boy's mother. The talk was of the type one would expect under the circumstances: vague, mystifying, terrifying. For instance, the boy was told that paralyzed people who walked with canes were that way because of "bad lives," and that masturbation would drain off his spinal fluid, making him weak-minded or even crazy. Besides other misinformation the boy was further led to consider sex as dirty and taboo because of the father's hesitant manner and obvious uneasiness.

Adjustment of the adolescent to the world forces the recognition of additional factors. Concerning his family the adolescent is faced with comparison of it with other families of which he knows and there comes up the beginning awareness of such things as social standing, economic status and the seeming intra-family happiness of others with possibly the lack of it in his own family.

Case 2. A girl of 14, quite well developed physically and mentally for her age, had been having terrifying dreams at night; she would cry out as if in fear and often as if in anger, would wake others, but on their awakening her and trying to find out what was wrong she would be unable to recall any particular dream. Investigation showed that there were two brothers, no sisters, and a henpecked father. Being the only daughter she was her father's idol, and he wanted her to be perfect, so much so that he was constantly criticizing her clothes, desire for boy friends, and so forth. As an example, one Saturday morning when she was going on a hike with a group of young people from the church, she came to breakfast in riding breeches and a white shirt borrowed from her brother. Her father upbraided her for immodesty because he considered she did not have the shirt tucked down properly inside the breeches (she had never worn a boy's shirt before) and her pink undergarment showed through the white cloth of the shirt. After her father had been shown that his excessive criticism of the girl was upsetting her and was liable to turn her against him, and after the daughter had been shown that her father's seeming distrust of her moral tendencies was because of his desire that she be perfect, the episodes of night cries ceased. More detailed study of the case would show a number of definite mental conflicts in the father's personality as well as in the mother's and particularly the war between the two, but we are concerned only with the relatively simple measures needed to clear up the daughter's difficulty.

The dominant parent influences the situation, and it is a problem just how the adolescent will mature with such a force exerted on his personality. Here too one must consider the effect of a "broken" home, whether it be from death, separation, divorce with or without remarriage or the presence of a step-parent. In school there is an adjustment to the varying personalities of teachers and the influence of these personalities on the adolescent. To what type of teacher is he attracted; from what type is he repelled, one resembling a parent or the direct opposite? By an evaluation of how each school subject is handled one can obtain a fairly accurate idea of the adolescent's qualities of intellect, emotions, ambitions, stableness and relative maturity of personality. From his friends one can further judge his personality: Does he choose those of his own age and social status, does he dominate or only serve? How does he adjust to strangers: Is he matter-of-fact, friendly or hostile, neutral or suspicious, and why? In a change of neighborhood the adolescent is faced with the problem of making new friends or going back to the old neighborhood during his leisure: Which does he do, and why?

PROBLEMS PROMINENT IN THE EARLY PERIOD OF ADOLESCENCE

Bodily changes are of particular importance between the twelfth and sixteenth years because of adjustments needed to handle rapidly increasing size and strength, physical clumsiness and awareness of sexual development. The adolescent may show bashfulness, sensitiveness and moodiness, particularly if he was of that temperament as a child and the stress of adolescent changes is aggravated by callous ridicule by members of the family and acquaintances. A certain amount of good-natured "kidding" is of definite value in easing the adolescent's sense of shyness, inferiority and feelings of strangeness, for it is possible to make the adolescent see the humorous side of his difficulties, particularly the gross ones such as clumsiness, gawkiness and voice cracking, and to show him that others his age are similarly affected. The sexual changes are usually those most liable to cause difficulties, with the young adolescent's rather frequently having trouble adjusting to the occurrence of menstruation, erections and nocturnal emissions, and particularly masturbation. This last is much better understood today but is still very frequently accompanied by psychological struggles of varying degree. As previously mentioned, sexual curiosity, precocious sexual experiences, anxiety of sexual origin, the comparison of mother–sister ideals and father–brother ideals with what is found in real life, are some of the problems engendered relative to sexual awareness in youth.

Case 3. A girl of 14 hated her mother because of the following incident. At the age of 12, while at the beach among a mixed crowd of friends and wearing a white bathing suit, she menstruated for the first time. The accident was called to her attention by one of the other girls after most of the group had already noticed her predicament. Not only was she embarrassed and humiliated but also terrified until someone explained to her what had happened.

Loss of a loved one may more or less profoundly upset the personality balance of an adolescent, the loss resulting from death or separation from parent, sibling, close relative or friend. The

adolescent may begin brooding over "death and the futility of it all" to a most unhealthy and occasionally tragic degree. Cases of this kind, when of noticeable seriousness, are best handled by a psychiatrist, particularly if the adolescent is of the sensitive, impulsive, seclusive type.

Personal failure, whether in school, job or career plans, may retard the young adolescent's maturing. Often one finds the sense of personal failure is due solely to or is markedly aggravated by the adolescent's comparing himself to a more successful sibling or acquaintance, or to the parents' pointing out such a comparison to him, or his planning on too high a level for his abilities. Such a situation may require a change of school to offset the retardation of normal progress (Case 8).

Puppy love, or the first heterosexual attachment, is a delicate situation in many cases. The emotional event is usually pure and idealistic, and if properly nurtured by the parents it will lead to the development of a healthy character disposed to high love ideals. It is a serious thing to the adolescent, so treat him kindly; good-natured "kidding" is of value in tempering the adolescent's idealism with a little realism, but ridicule and scorn are both cruel and dangerous. It is wise to keep the affair in the home or in the company of others such as at movies, games, dances and parties, with a group of suitable companions. On "house dates" the girl's parents should be present in the early part of the evening, and close by for the remainder of the evening; however, the parents should not show signs of mistrust or spying lest the adolescents take this for a dare and give the parents reason for mistrusting them. If the adolescent chooses some undesirable companion as a love object the parents can better control the situation by inviting the individual into the home and treating the affair impersonally, hoping that the adolescent will eventually see the undesirable qualities of the love object and terminate the acquaintance. If the parents forbid the affair or are rude to the companion and become melodramatic over the situation, they are merely strengthening the love affair by adding to it martyrdom.

Mental hygiene as a subject should be in the curriculum of every high school, and as an object should be available to both faculty and students through the medium of a consultant psychiatrist. Great steps have been made in affording routine general physical and dental check-ups on schoolchildren, but the so-called mental side has been neglected. Routine mental examinations are not needed, but there should be someone trained in mental hygiene to whom both faculty and students can go or be sent to have their personality difficulties checked over, and this same individual should give both faculty and students a series of educational talks on mental hygiene as a specialized field of medicine and as a part of everyone's everyday life.

Case 4. A high-school biology teacher with a hobby of psychology spent a good deal of the class time expounding his personal ideas of the cause and cure of mental diseases. He delighted in describing the fearful-appearing maniacs he claimed to have seen on trips through a state hospital. He filled his students with a great deal of terrifying material and a commensurate amount of misinformation on things psychological and psychiatric.

Case 5. A gymnasium teacher, very masculine in appearance and quite rugged, put her classes of girls through various very strenuous exercises, tumbling acts and pyramid formations that were obviously unsuited to the average girl's physique. She expected the girls to be as strong and tireless as she, and by scorn and ridicule drove them to exceed their physical abilities.

Social changes follow fairly definite patterns, with first a rather tacit separation of sexes by their divergent interests, the boys occupied by sports, gangs and adventure while the girls keep busy with their own sports, domestic tasks, reading, music and school work. In the middle teens the merging interests of the sexes bring them together again, as the boys no longer consider dancing as "sissy stuff" and the girls wax coquettish.

Case 6. A girl of 15 became depressed, moody, self-accusatory, irritable in relation to her parents, and kept to herself a good deal. Interviews revealed that she had been frightened by the sexual advances of a boy, believed herself bad for not checking him more quickly than she did and worried that others could tell she had been "soiled by a dirty boy." Proper sex education, a little advance information on what to expect at times from young men and general instructions concerning how to handle such a situation would have prevented such a psychosexual trauma in this girl.

In school there is quite an adjustment to be made in the change from grade-school routine to a high-school curriculum which provides more individual freedom and responsibility because of the change from one room and one teacher for the day to that of a schedule calling for several teachers and several rooms, study periods, free periods, the lunch period and its social life, and assembly meetings. With the development of the junior high school there has been a more gradual change from primary to secondary school, but despite this there is a very real difference between the two in the adolescent's experience. He may find that the relative freedom of the high-school schedule leaves him unguided, unsupported and rather lost for a while, and the degree of this aimless confused period varies inversely to the relative maturity of personality.

PROBLEMS PROMINENT IN THE LATE PERIOD OF ADOLESCENCE

Social adjustments are usually heterosexual between sixteen and twenty-one, with active interest in the opposite sex manifested by learning to dance, going to parties and a wide familiarity with the current popular songs, dance orchestras and movie stars. One will find, incidentally, that the frequent "love and kisses" wording of the popular songs is much less sensual in actual meaning to the adolescent than superficial reading would indicate. At this time the adolescent who is backward in such social adjustments often begins to assume the appearance of a "wallflower" and is quite unhappy about it.

At about this time the adolescent should begin tentative plans for a career, and he should be helped in this by some adult, such as a school faculty adviser, who has been designated to give vocational guidance. Now the advisability of the adolescent going on to college should be determined. If a college career seems wise, should he train for business, a profession, such as medicine, nursing, dentistry, teaching, engineering, and so forth; or should the adolescent turn into the pathways of the trades, or into clerical work? The value of a part-time job while in high school, keeping in mind the adolescent's health and the proportion of time allowed for his studies, is often very great. Many times a night-school education can be advised and planned, so that on graduation from high school and after obtaining a full-time job the adolescent can continue the development of any special talent or ambition he may have. Incidentally, in this present period of considerable national unemployment the adviser might suggest tentative plans for postgraduate high-school courses or night-school courses should the adolescent finish high school and find no job.

Case 7. A boy of 19, the fifth of seven children, had had 1 year of college with partial failure because of living at home and of an immature personality. His father was a construction engineer; the boy wanted to be a physician and had the necessary capacity. The mother dominated the family by spoiled-child methods and by disabling headache attacks of definite psychic origin. Because the medical course took so long and the boy would have to go away to school, she insisted by the usual methods that he take engineering, giving as her reasons that the father was an engineer, the course was shorter, the boy could live at home and use the family car to go to and from school, and she needed him at home as he was really the oldest boy since his older brother was working away from home. The situation was cleared up by blunt questioning of the mother's motives, pointing out to her the selfish nature of her reasons in wanting him to take engineering. Subsequent events revealed the value of correcting this situation for the boy, as he went into the premedical course and had great difficulty with a minimal amount of mathematics. With such poor aptitude for mathematics he would have been a tragic failure in engineering school.

Case 8. A boy of 18, and of low average intelligence, was pushed into an engineering school from which his father had graduated. He failed, was labeled "dumb" by his father and became depressed. It was found that he had a knack for repairing things like clocks, electric motors, and so forth, and was given a course as a machinist. As a result he is now a skilled mechanic and machinist, well adjusted to himself and the world.

Personality development in general should be considered. Has the adolescent learned to get along with people in general? Has he matured? Has he shown evidences of stableness, initiative, perseverance and responsibility? Moodiness, seclusiveness and irritability may be evidences of secret troubles, nearly unlimited in variety, that keep him preoccupied, sensitive and chronically on the defensive. Inner conflicts and personality struggles can markedly lower an adolescent's efficiency.

Case 9. In a Boston suburban high school in the winter of 1937 there were five runaways among the student body within three weeks, each one independent of the others, although suggestion may have influenced one or two. There is certainly a psychological story behind each case and the following one is known to the authors. A boy of 16 had had a stepmother from the age of 5, and as he grew up she continued to punish him in very childish ways, that is, though the punishment might be justified her methods would humiliate him and make him ridiculous as a "baby" in the eyes of his playmates. For example, even when he was as old as 13 or 14 his stepmother was still making him stay in the yard or go to bed without his supper because he had been disobedient. As he continued to grow older the disciplinary measures remained almost constantly childish; finally when one or two poor marks were received in school he rebelled against the humiliating discipline he knew would come and ran away from home. The revealing part of it is that he went directly to the home of his maternal aunt in New York City, a woman who had always closely resembled her sister, that is, the boy's mother.

Alcohol is a common problem met with by nearly all adolescents, and is best handled like the question of sex — educate, do not preach, keep the adolescent well occupied in reasonably controlled environments, and should he experiment with unfortunate results do not be too quick to damn him. Alcohol is usually first used to be a "good fellow" and to show off; if it persists it is an escape mechanism requiring intensive psychiatric treatment by a specially trained physician.

Sexual conflicts always occur, and should be forestalled by routine sex education at various ages in the adolescent's life; there should always be someone to whom he can go with these problems, better someone outside the family, and best his family physician. In girls must be considered masturbation and menstruation, in boys masturbation, nocturnal emissions and erections, and in both

there occur the problems of petting, erotic literature, sexual relations, both homosexual and heterosexual, and psychosexual trauma by adults.

CASE 10. A girl of 18 had hated her mother for the past 3 years because she was a junior in high school before she found out from the talk of other girls the exact origin of babies. She had matured slowly and missed much of the meaning of the risqué talk among the girls at school, and when she finally caught on one day among a group of schoolmates her surprise and embarrassment were so obvious that the others immediately realized how "dumb" she had been and ridiculed her unmercifully. Because her friends continued to tease her about this incident, her coldness toward her mother persisted, for she believed — and who can blame her? — that her mother by appropriate instruction should have prevented such a humiliating experience.

RECOMMENDATIONS

Understanding and patience are the prime factors in the handling of adolescent problems, and these should be assisted by the ability to interfere to a minimal degree and never to act hastily because of anger or disappointment.

Trust in the adolescent and you help him mature; treat him more and more as a grownup and you flatter and encourage his strivings for maturity and independence. Give him some responsibility in the household, keep him reasonably posted on the family finances, teach him to handle money; do not coddle him or do everything for him!

CASE 11. A woman of 25 had been married for 6 years and had had two children. For the past year she had been separated from her husband and living with her mother, who had always dominated her. From the time of the girl's marriage the mother tried to run the affairs of her daughter's house, even to the extent of arranging the furniture in the new home, and each time the daughter moved the mother would go to the new residence, there to arrange things her way. Finally the long-suffering husband walked out on the girl.

Hobbies should be suggested and encouraged, for they often solve the problem of what the adolescent does with his leisure. Cultivation of a hobby of the indoor type and of the outdoor type in each adolescent is advisable, and these in turn should be intelligently guided to afford development of individual effort as well as social or group effort.

Sports, when sensibly balanced between competitive and group-pleasure ones, are an efficient method of inculcating in the adolescent's personality the qualities of good fellowship, modesty in winning, gracefulness in losing, good personal hygiene and a love of the outdoors.

Group work of almost any kind promotes the development of a well-balanced total personality, and such organizations might be mentioned as Boy Scouts, Girl Scouts, Y.M.C.A., Y.W.C.A., school clubs, neighborhood clubs, and gangs when their object is constructive rather than destructive adventure.

Domestic duties should comprise a certain part of the girl adolescent's training and not be left to a school domestic science course. Blessed is the girl who can do a reasonable variety of cooking and housekeeping, both from her own sense of personal value and from her marriageable value, and very shortsighted is the mother who raises her daughter to consider housekeeping a foolish drudgery. Of similar nature is the wisdom of training the boy to be a handy man about the home and with the family car.

A psychiatrist should be affiliated with every high school, both junior and senior, because the students are then in the age of the most rapid psychosocial development, and proper guidance during these years will result in well-rounded personalities with maximal use of their individual capacities.

The family physician should be on the lookout for the first signs of personality warping in the adolescent; he knows the boys and girls from infancy and childhood, and is in an enviable position to note defects early and institute mental hygiene therapy as a preventive measure.

Alcoholic and psychotic patients and those who do not respond to the usual mental hygiene methods are best handled by the psychiatrist.

SUMMARY

It is most important for the general practitioner to give time to the adolescent; when a problem is recognized and the adolescent will co-operate, he should be given an appointment for at least one hour of uninterrupted time and allowed to talk unchecked. A few notes should be taken of the special difficulties present, and when he is talked out, which is usually in the first interview, the examiner should patiently go back over the things noted and begin the process of re-education.

Adolescence is a definite, rather broad stage in the growing up of the individual and comprises those years of most rapid psychosocial development. Most adolescents pass through these years more or less successfully; there are an appreciable number, however, who are scarred by the process and are left with rough edges on their personalities, and these flaws in their personalities continue as sources of irritation throughout life, both to themselves and to those in contact with them. How often it is that a little understanding and guidance during these formative years will smooth out any such developing rough edges and produce stable, well-rounded adult personalities. Mental hygiene precepts applied actively to boys and girls of high-school and college age by the

family physician are of inestimable value to them and to the communities in which they ultimately settle as home builders. The majority of personality disorders in adolescents can be prevented or removed if the family physician is on the alert and will give time, understanding and guidance to the adolescent before personality deviation becomes fixed or marked.

BENNO REINHARDT, 1819–1852

A Biographical Study and a Contribution to the Early History of Virchows Archiv

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GENERALLY the medical historian has paid little attention to a few individuals who, a century ago, had done so much to transform the esoteric, decadent medicine of Germany into medical science as it is known to us today. Virchow is rightfully hailed as the father of cellular pathology, and his name is immortalized by *Virchows Archiv für pathologische Anatomie und Physiologie und für klinische Medizin*. Yet the driving force in the inception of this periodical was a young physician who died in the prime of his life and activity, but whose name has been buried in oblivion. Only scattered records are available, and even these are inaccessible and hidden away in obsolete journals and obituary notes. Virchow himself gave unreserved credit to him whose life history is here reconstructed.

Benno Ernst Heinrich Reinhardt was born May 14, 1819, in the little rural town of Neu Strelitz, then the capital of the Grand Duchy of Mecklenburg-Strelitz, as the eighth child of Friedrich and Sophia Reinhardt, née Linecke. Although the year of his birth is occasionally given as 1820, his doctor's dissertation[1] verifies his birth year as 1819. From early childhood he enjoyed the congenial home and environment of a cultured middle-class family of sufficient means to afford the best education for the children. His father, a pharmacist, was greatly interested in the new development of organic chemistry and medicine, and aroused in the plastic and receptive mind of his youngest son a profound interest in the natural sciences. Not much is known of Benno's formative years, except that he entered the local Gymnasium (high school), where he progressed satisfactorily in the pursuit of humanistic and scientific studies. Also as was the custom of the educated middle class of Germany, the study of music and singing was a prerequisite to a cultural education, and young Reinhardt, like Billroth and other great German contemporaries, loved and appreciated good music. An accomplished cellist, with a fine tenor voice, he was much in demand among his friends and fellow students.

At the age of twenty Reinhardt matriculated as a medical student in the University of Berlin and devoted the first two semesters to the lectures of such men as Johannes Müller, Schönlein, Henle and Schlemm. In this entering class were a number of attentive and brilliant young men, destined to become the scientific leaders of modern medicine. These were Rudolph Virchow; Ernst von Brücke, later professor of physiology in Vienna and associated until his death with the New Vienna School; Emil DuBois-Reymond, the founder of electrophysiology and, in 1858, successor to Johannes Müller's chair of physiology; Riess, who in the revolutionary days of 1848 directed the Handwerker Verein of Berlin in its struggle for political equality; and finally Benno Reinhardt himself.

While in Berlin, Reinhardt devoted himself to the study of botany and zoology, which had achieved new interest by the discoveries and studies of Schleiden. He left for Halle in 1840 to study under the two Krukenbergs, d'Alton, Meier and Blasius, and he became particularly interested in microscopy and clinical medicine. It was then that he decided to devote his life to anatomic and microscopic pathology.

In 1843 Reinhardt returned to Berlin for his last semester and met many of his later friends and collaborators, particularly Rudolph Leubuscher, Neisser and Traube, the editor of the *Beiträge zur experimentellen Pathologie und Physiologie*. Although this journal survived only two numbers, published in 1846, it served as the model and precursor of the later *Archiv*.

Reinhardt graduated as doctor of medicine in 1844 with the presentation of an inaugural dissertation, *De peritonitidis symptomatologia*,[1] written in Latin, as was still the custom of his time. This

thesis consisted of several parts, one of which opposed J. Vogel and was later published[2] in more elaborate form in Traube's *Beiträge* in 1846. Virchow was attracted by the new views expressed in Reinhardt's dissertation and decided to call on him early in 1844. Of this meeting Virchow[11] wrote later:

> I became acquainted with him in 1844 when he had returned to Berlin for graduation, still wearing his native costume. At that time he was already greatly occupied with the examination of pus. . . . It was this observation which inspired me to meet him. On paging his dissertation, which he never regarded as a valuable contribution to medicine, I found as a dedication an old wood cut from Nuremberg pasted facetiously to the fly leaf, beneath which Reinhardt had written:
>
> Schöpfen aus der Freundschafts Quelle
> Lass uns, die uns nie versiegt,
> Ehe, wie die leichte Welle,
> Uns das Leben schnell verfliegt.

This verse may be freely translated as: "Let us drink from the fountain of friendship ere it ceases, and before life leaves us like a rippling wave."

Neither Reinhardt nor Virchow realized at that moment that this characteristic aphorism would be the epitome of a lifelong friendship, to be abruptly broken only by Reinhardt's premature death in 1852. Both men cherished the same basic ideas and conceptions with regard to their science and their philosophy, and became intimate friends, meeting almost daily. Both were members of the Berliner Gelehrtenbund, a group of young physicians. Reinhardt always advocated and urged the independent action and progress of this society. With Virchow he opposed and fought the then current tenets of medicine and planned to create a new medical science based upon the newly reorganized and fertile soil of natural sciences as developed by Schwann, Schleiden, Liebig and their own beloved teacher, Johannes Müller.

Faculty medicine especially aroused the flaming ire of Reinhardt, and the still vivid memory of the state examination led him to determined opposition. He sought to supplant the esoteric or secretive medicine, as he used to call it, with a new exoteric or intelligent medicine. In the opinions of Virchow and Reinhardt the time had come to do away with the then still prevailing doctrines of humoral pathology and to build up an entirely new science of physiologic pathology, based on the new cellular theories of their famous teachers. The favorite topic of discussions between Virchow and Reinhardt was the establishment of a new medical periodical, to be published independently and outside of the decadent and obsolete medical faculty. Reinhardt was the mainspring and driving force of this new movement, and Virchow[11] wrote:

> The idea of developing a new activity in exoteric form outside of official circles was the most frequent subject of our conversations. The kindness and quietude which Reinhardt usually displayed in social intercourse often vanished entirely at such discussions. After we had paced the room for half a night, as so often happened, our ideas crystallized more and more into intelligent and tangible plans. Under such circumstances our desire to publish and edit our own medical journal became ever more real. Reinhardt, especially, who had elaborated upon his paper on pus, set out in actual ire to begin independently.

In this quotation Virchow himself gives the greater credit to Reinhardt for the inception and realization of the publication of the *Archiv*. A letter written by him[11] to Virchow on December 12, 1845, shows more than anything else Reinhardt's ambition and energy:

> It is absolutely necessary that we come together and start an energetic campaign against those esoterics who now crowd our science with their silly humbug. When we read all the nonsense which is being promulgated then we must be driven crazy. Formerly such subjects were treated in therapeutics and materia medica, or in sublime ideas on the character of disease. This may be granted them. When, however, the same people approach pathologic anatomy, microscopy, and so forth, it can be suffered no longer. Against this we have to wage a relentless revolt. If it continues this way, general pathology and microscopic anatomy will become just such a junkshop of reverie and stupidity as materia medica is now. It is imperative that this nuisance be now assailed by thorough and detailed researches as well as by pitiless criticism, executed with utmost brutality. Schleiden's *Grundzüge der wissenschaftlichen Botanik* should serve as an example for our strategy.

With an amazing fighting spirit Reinhardt adopted the new tenets of modern natural sciences. We cannot but wonder how much passion and fervor lay buried beneath his kind and timid nature. Rudolph Leubuscher, a student friend who lived and boarded with Reinhardt in Berlin during the latter's last years before graduation, and who himself graduated as a physician the year before, wrote[9] in the introduction to Reinhardt's posthumous papers: "He was a man without passion, but of highest intellectual integrity and honesty. Only science and music could stir his soul and emotions to a pitch."

Reinhardt's process of thinking was deliberate, but he never gave up a problem until he had solved it. Often he would carry an idea with him for years, and then would suddenly decide to solve it without rest or interruption. Psychologically Reinhardt was an introvert, shy and timid. He loved solitude and disliked social affairs. But once won over he was the best and most loyal friend. How close, then, must this new science of medicine have been to his heart! How enthusiastic and devoted he must have been for his cause! It is not surprising that he risked his life, and gave it,

for such a noble task — yet he lived long enough to see his greatest dream come true.

On April 6, 1847, the first number of this new periodical appeared, bearing the title *Archiv für pathologische Anatomie und Physiologie und für klinische Medizin,* under the joint editorship of Rudolph Virchow and Benno Reinhardt. The prospectus which occupied the first two pages clearly stated the aim and purpose of the new periodical, or rather the ambition and object of its devoted editors and collaborators. For its importance in medical history it is here translated in its entirety.

In publishing this new medical journal we first of all wish to satisfy a long entertained desire of ourselves as well as of many others in northern Germany who have felt the absence of a medical periodical edited with the highest intellectual integrity. From our *Archiv* we exclude in principle everything not directly connected with medicine proper, that is, not concerned primarily with pathology and therapeutics. This journal shall be accessible to anatomy and histology, to physiology and chemistry, but only in so far as they are applied directly to medicine. We could have limited our scope still closer if an absolute isolation of the individual medical disciplines of our time had permitted it.

The point of view which we take, and the detailed motivation of which is stated in this number, is that of pure natural science. Practical as well as applied medicine and theoretical as well as pathologic physiology are the ideals which we shall serve and for which we shall do everything possible within our limitations. While absolutely granting the independence and necessity of pathologic anatomy and clinical medicine, we regard them, nevertheless, only as sources for new problems and questions the answer to which must be found in pathologic physiology. Since, however, these questions can be answered only after painstaking and detailed studies of the symptoms found in the living body, and of the conditions manifested at postmortems, we demand primarily and chiefly a detailed and progressive development of anatomical and clinical experience. Such empirical research only can gradually produce the true theories of medicine — that is of pathologic physiology.

We do not, therefore, solicit contributions which completely close the discussion of any given problem. Nevertheless, we demand that every contribution must be the result of detailed research, and should actually promote the problem studied. For this very reason we have decided not to publish subsequent numbers at any given regular intervals, because this would necessitate superficiality of treatment. We shall publish additional numbers only when and if sufficient contributions of the type just mentioned are available. However, we hope to be able to promise for publication this year another number of about seventy-two pages. The interest of the collaborating and reading physicians must decide the future of this enterprise. Finally, only original contributions have access to our *Archiv,* and we leave it to the future to decide to what extent critical and statistical material shall be considered.

The publisher, Georg Reimer, announced in an appended note that the price for each volume, comprising three individual numbers, would be approximately two dollars.

The *Archiv* was finally born. Virchow[11] said of the aim of this journal:

Many a journal is born by speculation of a publisher, . . . by ambition to head a periodical, or by the urge to climb to the top, and thus to achieve power. Such a man is inclined to work himself, but far oftener he prefers to have others work for him. Space-fillers and miscellaneous and feuilleton articles are written, or dissertations and other articles are reprinted. The real work is being done by the contributors for little or no remuneration.

All this did not apply to us. We had to look for a publisher. That we succeeded in finding such a reliable and disinterested man was due only to a combination of fortunate circumstances. Lack of work was unknown to us. And even though we did not intend to work without some monetary reward, we excluded in principle the salary of the editors so long as the work was not linked with direct and considerable expense. The aim of the *Archiv* was to achieve influence. We were then just in that period of life where we had few needs, but we had a burning desire for creative activities. We were determined to bring the greatest sacrifices because we rated the chance to guide science far higher than personal or official success. . . .

From the beginning our work for the *Archiv* experienced many difficulties. The political activities of 1848 excited Reinhardt no less than me in our political views; and even though his political activities were limited to a smaller circle, they promulgated the same aims. Our separation, the new positions, the founding of the *Annalen des Charité-Krankenhauses* and my negotiations with Würzburg seemed to bring about the end of the *Archiv,* even though neither Reinhardt nor I intended to let it die.

It was a valiant fight that these two men waged for their journal, and they succeeded. It appears that Reinhardt, who was ill at the time, had the strenuous task of supervising and editing the *Archiv,* while Virchow lived in political exile in Würzburg. This task was only a minor part of Reinhardt's scope of activities. During the time of the establishment of the *Archiv* he continued his researches and published a paper[3] on granulation tissue in the first number. This paper was criticized by Jakob Henle, and Reinhardt refuted Henle's contentions in another paper[4] on the mitosis of nuclei. In the same year (1847) he became assistant to the gynecologist, Karl Mayer. Moreover, he pursued ceaselessly his work in microscopical researches, which progressed only slowly, owing to great difficulties in procuring the necessary material, since no official position gave him access to the morgues of the hospitals. Virchow, prosector at the Charité since 1846, finally solved this problem for him. Yet even this did not furnish an adequate outlet for Reinhardt's immense energies. He therefore established his own private practice while continuing his work on albuminous urine. These studies were the basis for a paper[6] on Bright's disease which was published in 1850 in the first volume of the *Annalen des Charité-Krankenhauses.*

In 1848 Berlin was seized by the historic cholera epidemic, and during this period Reinhardt ob-

tained a somewhat independent position in the cholera hospital directed by Schütz. The results of this experience were published in a paper[5] on cholera, written in collaboration with his friend Leubuscher. The termination of the epidemic, however, also ended Reinhardt's connection with the cholera hospital. Incidentally, Hein and Dümmler, two other young and promising physicians, were among the victims of this dreaded disease, and Virchow never forgot the terrible sufferings of the latter, an intimate friend.[15]

In the winter of 1848 Reinhardt established himself in the University of Berlin as lecturer on pathologic anatomy and microscopy. He delivered the inaugural lecture in the great auditorium a year to the day after the inauguration of his friend Leubuscher, who had graduated a year before him.

Reinhardt's highest merit as a teacher was his intellectual integrity and honesty, but this very objectivity made his lectures dry and matter of fact. Only gradually did he succeed in gathering around him a circle of devoted students. It was a slow but steady growth, and he gave his personal attention to those who cared to listen to him. Of interest here is Leubuscher's account of Reinhardt as a teacher. In later years he[9] wrote:

> As a teacher he [Reinhardt] was conscientious. It pained him greatly if he could not elucidate the entire subject under discussion. He was scrupulously precise in the treatment of his subject, and only for this reason refused to season his lectures with spirited digressions to subjects other than those just presented. He was as honest in science as he was in his personal affairs. Although shy and bashful, he was loyal and devoted to those whom he came to love.

Reinhardt would never alter or modify any fact or observation in order momentarily to please someone, even at the price of favor and friendship. Being, furthermore, of a very indecisive mind he had the peculiarity, inexcusable in his position and work, of never consulting any but the most necessary books and references. In fact, his friends always had to tell him what to read. Yet he preferred to find everything for himself, thus losing much time and wasting much of his valuable energy.

Reinhardt remained a teacher until his death. In 1849 he became an assistant in the clinic for internal diseases, then still connected with the university, and located on Ziegler Strasse. By Easter of the same year he finally succeeded in obtaining the comparatively independent position of prosector at the Charité, when Minister Ladenberg decreed the deposition of Virchow because of his political activities. At first Reinhardt refused this position in loyalty to his friend and predecessor. In fact, Virchow had to implore Reinhardt to accept the new opportunity by convincing him that the selection of someone else might prove to bring about the end of the *Archiv,* and of the new scientific movement they had created. The decree of Virchow's deposition was soon revoked, but Virchow had already accepted the professorship of pathologic anatomy in Würzburg, and Reinhardt was formally appointed to the prosectorship in the fall of the same year. He retained this position until his death in 1852.

The Only Available Portrait of Benno Reinhardt (Roessle[14]).

During the last six years of his life Reinhardt was afflicted with pulmonary tuberculosis. His ambition and perseverance did more than any other factor to weaken his already impaired health. Furthermore, he led an irregular life, transforming night into day, often neglecting his regular meals and his sleep for weeks. Frequently he would not leave his room for days at a time, denying himself the recreative and resting amenities of social contact. Since he had remained unmarried, the admonishing and sympathetic understanding of a wife was unknown to him. He had only his few devoted friends to exhort him, yet even their arguments and often violent representations could not change his mind, in spite of his sufferings from exhaustive fatigue, overwork and insomnia. The first symptoms of active tuberculosis became manifest in the spring of 1846, and Virchow[11] recorded this attack as follows: "One

night on our way home from a meeting of the Gelehrtenbund, Reinhardt experienced sharp pain in the chest, and immediate physical examination revealed pleural friction. Soon thereafter hemoptosis developed and the auscultatory signs of an infiltration of the lung parenchyma became apparent." Careful nursing restored his health, and Reinhardt believed himself cured. Yet in spite of his first attack he would laugh at his friends' exhortations to take better care of his health. As before, he buried himself in his studies, working ceaselessly and even enlarging the scope of his activities. The result was a second attack in 1847, and from then on his health declined rapidly. In spite of extensive travels, vacations at the seashore (Heligoland) and proper care, he could no longer stay the progress of the disease. During the winter preceding his death he suffered from numerous colds, rheumatism and catarrh — yet he continued his work. Early in January, 1852, he again went to Heligoland for a vacation following a severe attack. On his return his health seemed greatly improved, but a sudden attack of petechial fever terminated his active life. He died peacefully without pain on March 11, 1852, in his thirty-third year.

Virchow was in Würzburg when Reinhardt died, but he never forgot his loyal friend and collaborator. He[11] wrote the following in a memorial address for Reinhardt:

What we had planned is achieved even to a greater degree than we dared to hope. Natural science is now the basis also of medicine. It is not our merit to have founded this method. It would have come in all probability even without us, and new ways and trails would have been opened. The battle, however, against the existing conglomeration of arbitrary rationalism and crude empiricism which we have fought in the *Archiv* . . . did, as I believe, accomplish much to change the direction of pathology. Let us continue in the sincere and earnest endeavor which was left us as a heritage from our deceased friend. Let us faithfully preserve his memory, as will also be done by science, which he served so loyally.

Leubuscher,[12] Reinhardt's closest friend, wrote in his obituary:

The few papers left by him will be the basis of researches in this particular field of medicine for a long time to come. Whether he would have lived up to our expectations, had fortune favored him more from the onset, we do not know. His was a nature depending on light and air for its development. He was taken away in the midst of his scientific development and growth. His future was promising. How many of us have loved this bashful, indecisive and irritable companion!

This young man of great promise died at the peak of his career, as did Osler's young friends, Hewetson, MacCallum and McCrae. And so, exactly fifty years after the death of the brilliant young French scientist Xavier Bichat, who died at the age of thirty-one, medicine again suffered a grave loss in the early death of a young and devoted German disciple.

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REPORT ON MEDICAL PROGRESS

PHYSICAL THERAPY

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TO SUM up the recent progress of the entire field of physical therapy in the space allotted would be impossible. The four branches receiving the most publicity at the present time will be discussed: fever therapy, radiant light and heat, diathermy and peripheral vascular disease therapy; the discussion is prefaced by a few notes suggesting the early progress of this branch of medicine.

There have been three distinct stages of progress in physical therapy in this country. First, during and following the World War the value of this branch of medicine became generally recognized among the medical profession. Second, in 1925 the American Medical Association appointed a Council on Physical Therapy consisting of nine members, and later twelve, who were specialists in various branches of medicine — only two of whom specialized in physical therapy. Their work has been to create and maintain standards for physical therapy apparatus, to disseminate information and to give whatever assistance may be desired to the profession concerning this form of therapy. Third, the council in 1934 requested five physicians whose practice was primarily concerned with this field of medicine to act as consultants on education in physical therapy and to do whatever might seem desirable to stimulate intelligent interest among the physicians and medical schools in the areas allotted to them. The work of these consultants radiates from Chicago, St. Louis, Philadelphia, New York and Boston, and their services are available for programs of medical meetings and for help in any form dealing with education in the field of physical therapy.

It is a most gratifying suggestion of progress to note that at present laboratories, clinics and some of the leading research and clinical men in their various specialties are striving to evaluate properly the various types of physical therapy methods and apparatus. Another encouraging trend is the increasing demand by medical undergraduates for an intelligent acquaintance with this subject. This has resulted in the teaching of physical therapy in a steadily increasing number of medical schools throughout the country.

During the last few years, in direct accord with the propaganda of manufacturers, there have been waves of enthusiasm for three types of apparatus used for treatment. With the advent of the mercury vapor lamp, employed to generate ultra-violet rays, and the general advertising campaign recommending it for the cure of a large number of diseases, these lamps were sold by thousands throughout the country. Today only a fraction of them are in use. We now know that the lamps are of definite value in certain pathologic conditions but that such conditions are relatively few. Later the infra-red generator — which for all practical purposes is the same as the heating element found in heating bowls — was advertised extensively to physicians as a remarkable discovery, and many purchased the generators. These too have a clear but restricted field of usefulness. Now we are beginning on a declining era of enthusiasm for high-frequency, short-wave apparatus. Nearly every physician in this country has been exploited by salesmen handling such machines. Many physicians who are not equipped by study, training or office assistance to use them successfully have nevertheless purchased them. Some of these physicians have already discarded the apparatus, while others should and will follow their example. The value of this type of machine is at present probably somewhat overrated, but the future will take care of demoting it to its correct level. It has, however, a distinct field of usefulness in the treatment of many pathologic conditions, which will be better appreciated as research more clearly defines the apparatus's value and explains its results.

FEVER THERAPY

Fever therapy has been tried during the last few years in many institutions and hospitals for probably no less than a hundred different diseases, because of their failure to respond satisfactorily to other therapeutic measures. The results are somewhat discouraging. Some of the pathologic conditions which, according to numerous investigators, receive little or no benefit from fever therapy are multiple sclerosis, subacute bacterial endocarditis, pulmonary tuberculosis, osteomyelitis, acute arthritis (except gonorrheal), Charcot arthropathies, hypertrophic arthritis and paralysis agitans — the last of which has in some cases been made distinctly worse.

A few diseases which respond well in the ma-

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jority of cases, as reported by various clinics, are tabes dorsalis, juvenile paresis, Sydenham's chorea and brucellosis. Early primary syphilis responds better when fever therapy is combined with chemotherapy. Syphilitic optic atrophy, interstitial keratitis, neuroretinitis and choroid retinitis may benefit by either artificial fever or malaria, but the best results are obtained by combining them. Cases of general paresis are best treated in the following order: malaria and tryparsamide; either alone; artificial fever and tryparsamide; and artificial fever alone. There are, however, some patients for whom fever therapy is preferable to malaria treatment: those immune to malaria, those living where it is difficult to obtain malaria organisms for therapeutic purposes and those who should not be subjected to an infection.

Gonorrhea was a very promising field for fever therapy, with a very high percentage of remissions, until the advent of sulfanilamide. This drug now takes care of a large number of acute or chronic cases of gonorrhea and its complications. One research clinic formerly treated six cases a week by fever therapy and now treats but one a month. Some clinics have achieved a large number of remissions (over 90 per cent) by using sulfanilamide and fever together, while other clinics obtain similar results by using sulfanilamide routinely and resorting to fever therapy only when the drug is not effective. Most of the more obstinate cases are found among the following types of infection: endocervicitis, salpingitis, prostatitis, endocarditis and arthritis. In cases of pelvic gonorrheal conditions in women which do not respond satisfactorily to sulfanilamide or fever therapy, it is frequently possible to produce encouraging results by the addition of local pelvic heating in conjunction with fever therapy.

Very little work has been done with fever therapy in dermatology. The following list suggests diseases which have been studied at a few clinics with marked benefit in a reasonably large percentage of cases: eczematoid lesions, erythema multiforme, psoriasis, urticaria, seborrheic dermatitis and endocrine disorders.

Little has been accomplished in solving the asthma problem with fever therapy. A small number of cases resistant to other types of treatment have been reported as helped by this method. These patients probably belong to the group which have had asthma for many years and are relieved for some months after an intercurrent disease such as pneumonia.

Mortality from fever therapy is being eliminated to a large extent in accredited hospitals, primarily because of recently acquired knowledge of the changes in body chemistry during the treatment and of the methods of combating them. It must be expected that with high temperatures there will be attendant dangers, even though patients are subjected to a thorough physical examination beforehand. For this reason, fever therapy should be considered strictly a hospital procedure. It should be undertaken only by experienced physicians assisted by nurses or technicians with special training, and with an emergency equipment close at hand, in order to avoid accidents.

Several years more will be needed for further study before an adequate evaluation of fever therapy can be made. At the present time there are several medical specialties in which it may furnish help in some cases which do not respond to the usual methods of treatment. Further scientific study of this form of treatment might well enlist the interest of leaders in these fields.

RADIANT LIGHT AND HEAT

Radiant light and heat concern themselves entirely with three portions of the spectrum: ultra-violet, visible and infra-red rays. These have measurable and distinguishing wave lengths.

The shortest rays are the ultra-violet. They are found in the spectrum next to the visible violet rays. They have no heat, but on long exposure, by a chemical process, cause sunburn. A few years ago ultra-violet rays were advertised as a cure for most human ills. Through clinical experience and research it has been determined that many of these conditions improved despite, rather than because of, the treatment; some — for example active pulmonary tuberculosis — were made worse, and still others — for example erysipelas — for which ultra-violet rays were often a specific are now treated largely by much simpler methods (with sulfanilamide). Many of the physiologic processes of ultra-violet irradiation are not well understood, but some of its physiologic results have already been determined. It has been found that the rays effect the provitamins occurring in the ergosterol and chloresterol in the skin, giving rise to vitamin D, which is responsible for the absorption of calcium and phosphorus and the prevention and cure of rickets.

Ultra-violet irradiation seems to have little influence on the healing of fractures.

Repeated, prolonged ultra-violet irradiation may cause precancerous lesions such as keratosis senilis and xeroderma pigmentosum.

Practically all bacteria may be killed or attenuated by ultra-violet rays, provided the exposure is long enough and the rays are uninterrupted. These conditions cannot be fulfilled in living tis-

sue except on surface lesions. However, ultra-violet irradiation has recently been demonstrated to be of value in killing air-borne bacteria. This function may have a universal application in the future if such use of the rays proves practicable for operating rooms.

Body enzymes and ferments may be stimulated or destroyed, depending on the wave length, energy and duration of exposure. Ultra-violet irradiation is of value in rickets, infantile tetany and several dermatologic conditions. The last include ringworm, certain stages of psoriasis, scrofuloderma, telangiectasia and pityriasis rosea, certain types of acne vulgaris and eczema (especially as an aid in relieving the pruritus of the latter), alopecia areata and the several types of alopecia prematura, and erythema induratum. Ulcers and wounds frequently respond well to the rays, except for chronic varicose ulcers and those resulting from Raynaud's disease and thromboangiitis obliterans. The rays are of little benefit in fungous infections, sycosis vulgaris, dermatitis exfoliativa and lupus erythematosus.

Ultra-violet irradiation should not be used in active pulmonary tuberculosis, but may be of decided benefit in extrapulmonary tuberculosis, for example skin, bone and joint, peritoneal, lymphatic, laryngeal and ulcerative intestinal tuberculosis.

It has been a common observation with many workers that visible or infra-red rays used in conjunction with ultra-violet rays increase the value of the latter in the treatment of many of the diseases noted above.

Of the visible spectrum we know little except that yellow gives us light, violet has some weak properties of the ultra-violet, blue and green are probably quieting and red is stimulating and heat-producing.

Infra-red rays, so far as is known, produce nothing but heat. Conversely, anything producing heat disperses it as infra-red rays.

DIATHERMY

For half a century high-frequency currents have been used in the treatment of pathologic conditions. The type of this current which is most commonly used is diathermy. Diathermy is employed for generating heat in the body tissues, the heat being utilized in two ways: for stimulating tissues, when it is known as medical diathermy, and for destroying tissues, when it is known as surgical diathermy. There are three types of surgical diathermy: desiccation current, causing dehydration of tissues; coagulation current, producing heat to the point of charring; and cutting current, which separates tissues as does a scalpel or a wire snare.

Medical diathermy produces not only surface heat but heat deep in the tissues. For many years the long-wave (300-m.) current was used with two metal electrodes in close contact with the skin. During the last ten years short-wave (3- to 30-m.) currents have come into use. These are of two varieties: one uses two air-, rubber- or glass-spaced electrodes in the form of pads or cuffs with the part to be treated placed between them; the other an insulated cable which heats the patient by induction from the electromagnetic field produced around it. The shorter the wave length the greater the frequency (number of current oscillations) and the more easily is the intervening tissue resistance overcome. Because of this, the short-wave currents, with from 10,000,000 to 100,000,000 oscillations per second, produce less skin effect and more even heating throughout the deep tissues than do long-wave currents. With each of these two types of current, control of the dosage must ultimately be under the direction of the patient. The short-wave currents seem to be more efficacious when producing only a very mild heat. This makes the danger of overheating internal structures highly improbable.

From actual recorded temperatures, we know that diathermy produces heat deep in the body tissues. There is, however, no unanimity of opinion among investigators as to the specific wave length best adapted to produce this heat, nor is it yet known why mild heat is usually more beneficial than heating the tissues to the patient's tolerance. It is possible that mild heat or certain wave lengths are more stimulating to the metabolic processes of the body.

Diathermy may be useful for the following conditions if they are deeply situated (when surface muscles are the ones affected, a heating lamp will probably be as efficacious): contusions, strains and sprains (cold is best applied for eight or ten hours after the accident), dislocations, inflammation of tendons and bursas, fibrositis, chronic arthritis, frontal and maxillary sinusitis when there is adequate drainage, pleuritic pain in pneumonia, occasionally bronchitis, and several other less common pathologic conditions. Diathermy seems to hasten the absorption of calcium deposits in bursitis. Neuritis not infrequently does better with a heating lamp than with diathermy. In cases of boils and carbuncles, the attendant pain and surrounding induration are usually lessened and either resolution or abscess formation is hastened.

Surgical diathermy may be conveniently divided into two parts: desiccation and coagulation currents produced by a spark-gap machine, and cutting current produced by a tube or a spark-gap machine.

In 1902, Le Rivière, of Paris, treated a patient with a form of high-frequency current. During the treatment the patient accidentally struck his hand against an uninsulated wire at the point where he had a wart. In due time the wart disintegrated and disappeared. Thus began the modern treatment of warts and moles by desiccation and coagulation. Law and Clark in 1905 reported the use of desiccation and coagulation currents in removal of skin cancer and even in that of portions of the tongue and face which were infiltrated with cancer. From these beginnings has developed the present cutting-current apparatus.

The desiccation and coagulation currents are used with a sharp needle electrode for the various types of skin diseases, among which are warts and moles, skin cancer, certain of the keratoses, obstinate leukoplakia, lupus vulgaris and other types of cutaneous tuberculosis, senile angioma, papillary nevus, fibroma, xanthoma, cutaneous horn, rhinophyma and hypertrophic rosacea. The current may also be used for the coagulation of tonsils (when there are definite reasons contraindicating the usual enucleation method), small vaginal or cervical polyps, infections of Skene's or Bartholin's glands and external hemorrhoids. Even though surgical procedures may be executed by this apparatus, found in the offices of many general practitioners, the fact remains that conscientious surgery and tonsillectomies must still be done by surgeons and laryngologists. However, it is likewise equally important that the specialist, before attempting to use this form of treatment on patients, devotes adequate time to its study and use, if unfortunate results are to be avoided.

The electrical cutting current was originally designed for cancer surgery in order to prohibit, by its searing effect, the spread of cancer cells. It is used by some surgeons for removal of cancer in almost any situation, external or internal. Tissues for biopsies may be removed with little or no bleeding. Some surgeons use the cutting current for non-malignant conditions such as resection of the stomach or intestine, and for complicated situations involving the liver or gall bladder. It has gained a very important place in chest surgery for removal of tumors, lobectomy, and so forth. In brain operations it plays a vital part by coagulating blood vessels. For separated retina it is recognized as the most successful method of treatment at the present time. Conization of the cervix is not routinely successful, but apparently is a valuable procedure when used in some types of cases under certain conditions. This current is extensively used for the removal of various bladder growths, for transurethral resection of the prostate, for prostatic bars, carcinomas and some hypertrophies, for urethral caruncles and for cysts of Bartholin's gland.

PERIPHERAL VASCULAR DISEASE THERAPY

Two types of apparatus are used in this field: a cuff, similar to a sphygmomanometer except that with this machine the pressure is automatically regulated in both amount and duration, which causes a reactive hyperemia as described by Bier and a metal, glass or celluloid boot extending above the patient's knee, into which air is automatically pumped and extracted, thereby producing an alternating positive and negative pressure within the boot; the amount and duration of both pressures may be regulated as desired. Some clinics use a heating lamp, mild diathermy or drugs at the same time to assist in dilatation of the peripheral blood vessels, which tends to improve the result. The purpose of these machines is to increase the blood flow and to open the non-functioning capillaries, thereby improving the nutrition of affected parts.

Possible indications for the use of this type of apparatus are arteriosclerotic ulcers. acute vascular occlusion, frostbite, early thromboangiitis obliterans, gangrene of the digits, intermittent claudication and rest pain. Contraindications to its use are: Raynaud's disease and other purely vasospastic diseases, extensive gangrene, thrombophlebitis, cellulitis or lymphangitis. extensive destruction of capillaries, venous thromboses, advanced thromboangiitis obliterans and frank infection.

The success or failure of this apparatus apparently depends on the extent of capillary block. In order to arrive at a reasonably accurate prognosis in most of these cases, arteriography with thorium dioxide must be done or the oxygen content of the venous blood obtained before and after using the apparatus. Because of the uncertainty of the results of this method of treatment, it has had a checkered career for many years. The present consensus seems to be that the boot type is somewhat less efficient as well as much more expensive than the cuff type. Neither, apparently, while occasionally of distinct value. has proved to be as generally successful as was hoped.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 25371

PRESENTATION OF CASE

A forty-nine-year-old unmarried woman was admitted complaining of diarrhea.

The patient had been well and active until two years prior to admission when she began having three or four loose bowel movements daily associated with pain on defecation. After four weeks a fissure in ano was excised, and she had a complete remission of symptoms. Three months before admission she began to have intermittent episodes of black tarry stools. There was no change of bowel habits, but she began to feel weak and fatigued. Five weeks before entry she began to have loose watery movements often associated with the passage of bright-red blood although there were no massive hemorrhages. On subsequent occasions she denied repeatedly that there had ever been blood in the stools. The severity of the condition gradually increased until at the time of admission she was having from eight to twelve movements during the day and two or three at night. She had low abdominal cramps for a few minutes preceding defecation and pain and burning in the rectum during defecation. During the previous five weeks she had had anorexia and nausea following meals, and on four or five occasions vomited after forcing herself to eat. There was no evidence of blood in the vomitus. She had lost 12 pounds in weight in the previous two months. Her past and family histories were noncontributory.

Physical examination showed a thin, pale woman who looked ill. The skin was dry and loose. Examination of the head and chest was negative. The blood pressure was 95 systolic, 55 diastolic. The abdomen was somewhat tense, with slight tenderness in the right lower quadrant. Rectal examination showed slight spasticity and irritability. There was a small external hemorrhoid. The uterus was negative.

The temperature was 100°F., the pulse 115, and the respirations 27.

The urine examination showed a specific gravity of 1.009, a slight trace of albumin, and 35 white cells with an occasional clump and a rare red cell per high-power field. The blood showed a red-cell count of 3,430,000 with 60 per cent hemoglobin, and a white-cell count of 12,300 with 86 per cent polymorphonuclears, 12 per cent lymphocytes and 2 per cent mononuclears. The nonprotein nitrogen of the serum was 19 mg. per 100 cc., and the chlorides 98.4 millieq. per liter. Twelve successive stool examinations were guaiac negative; no ova, parasites or tubercle bacilli were seen. A gastric analysis showed 68 units of free hydrochloric acid; the contents were guaiac negative. A 1:20,000 tuberculin test was negative. A proctoscopic examination showed a slightly granular rectal mucosa; the rectum was otherwise negative. The proctoscope could not be passed full length because of spasm. There was no evidence of colitis in the rectum and rectosigmoid.

X-ray films of the chest were negative. Two attempts at examination of the colon by barium enema were unsatisfactory because the patient could not retain the barium. Some barium reached the cecum and terminal ileum, which rapidly filled from the cecum. The cecum appeared to be small and rather smooth. The kidneys were normal in appearance. A gastrointestinal series showed a normal stomach and small intestine except for the terminal ileum where there was a loss of mucosal markings. The margins of this portion of bowel appeared straight and rigid. The cecum was grossly reduced in size, and its margins were finely irregular. There was also an abnormal mucosa in the ascending colon and right transverse colon.

She was treated with emetin, Betaxin and transfusions. Her condition remained essentially unchanged, and on the fifteenth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. LELAND S. MCKITTRICK: I am not quite clear in my mind about the findings on proctoscopic examination. It says, "A proctoscopic examination showed a slightly granular rectal mucosa," and then it says, "There was no evidence of colitis."

DR. CHESTER M. JONES: I did the proctoscopy. There was no evidence of ulceration, no pitting from previous ulcerations, and no capillary bleeding. It looked quite as a rectum does when you examine it after a soapsuds enema.

DR. MCKITTRICK: Had she been prepared? Had she been given any irritants?

DR. JONES: No. The appearance was merely what is seen following any prolonged diarrhea.

DR. MCKITTRICK: To summarize, she was a forty-nine-year-old woman who had had a story of diarrhea two years previously, with an associated fissure in ano, which is certainly not uncommon. In regard to that episode I should think that one could draw no definite conclusions except that the diarrhea had persisted for a period of four

weeks at least. Then she was all right until three months before entry. In other words if this is all a part of the same process she had a remission until three months before admission when she began to have black tarry stools. That was followed five weeks prior to admission by a definite bloody diarrhea, as evidenced by eight to twelve stools in the daytime and two or three at night.

Dr. Horace K. Sowles: It is only fair to say that the local physician denied the fact that she had tarry stools, and on rigorous cross-questioning she later denied the presence of fresh blood. We were never able to obtain a positive guaiac test. I think the blood story is misleading.

Dr. McKittrick: At the moment we shall leave that out and say that she had had one episode of diarrhea without blood two years before and another episode of diarrhea five weeks before admission, as evidenced by frequent movements both daytime and night. Lower abdominal cramps preceded defecation. There was a loss of 12 pounds and nothing else of value in the history. Physical examination was essentially negative, except that she looked dehydrated and sick, with evidence of loss of weight. She had a hypotension, and an abdomen which was a little tense, with some tenderness in the right lower quadrant. She had a low-grade fever and elevation of the pulse. The laboratory examinations showed a secondary anemia, a moderate leukocytosis, a negative tuberculin test and a questionable proctoscopic examination. If Dr. Jones found the mucosa to be granular, then it was granular, and I do not believe we have any right to discard the finding. From what he says I probably should not pay any attention to it, but still if it looked granular to him, it is going to look that way to me, at least for the time being.

Would this be a good time to see the x-rays, Dr. Holmes?

Dr. George W. Holmes: The chest film is negative as described. I presume that that is of some interest to a clinician because the question of tuberculosis might be raised. This patient has no evidence of tuberculosis in the chest, whatever that may be worth in the final diagnosis. There is also a film of the abdomen which shows no evidence of calcified tuberculous nodes, an observation which may also be evidence against tuberculosis. In the films of the gastrointestinal tract it is not easy to demonstrate the lesion described. I presume the man who made the examination had a better opportunity than we have, merely looking at the films. There is some evidence here of trouble in the terminal ileum. It does look stiff and irregular as he described it, but I should like to know whether it was a constant finding. The cecum also looks small. There is also a tendency for the barium to pile up in the terminal loop of the ileum. We have one film that shows the upper small bowel very well, and it is evidently normal. I think we have to rely on the description rather than the films. Apparently the lesion involves both the small and the large intestines.

Dr. McKittrick: In addition to a forty-nine-year-old woman who had had two episodes of diarrhea and at entry had evidence of loss of weight, dehydration and a little fever, secondary anemia and a leukocytosis, a negative tuberculin test and a negative chest series, we have a patient, who, by x-ray, had evidence of some kind of lesion involving the terminal ileum and proximal half of the colon. It seems to me that there are several things that one must consider. I think any patient, whether she is forty-nine or any other age, who has diarrhea and says she has passed blood and who has a proctoscopic examination that is not remarkable is under suspicion of having malignant disease, probably of the bowel. I should think that could readily be ruled out here by the duration of two years, by the essentially negative physical examination, by the fact that the diarrhea was not due to obstruction and by the x-ray findings. I mention that simply because it should always be considered in any differential diagnosis in which there has been a diarrhea, either with or without blood. Then, of course, one also has to consider the question of an amebic infection. That is difficult to rule in or out. This patient was in the hospital fifteen days and was treated with emetin. While I know relatively little about emetin I believe that in any patient with true amebic dysentery a course of emetin will result in definite improvement. I shall therefore be content to exclude amebic infection of the bowel merely by virtue of the lack of response to treatment.

I presume one should consider regional ileitis in discussing this problem. I do not know enough about the disease to make a very intelligent differential diagnosis. It does seem that the process is primarily one of the large bowel, a rather diffuse process, and there is little here on which I can make a diagnosis of regional ileitis, so I shall omit that from further discussion. It does seem to me that tuberculosis has to be seriously considered. The negative chest plate in no way excludes tuberculosis of the bowel, for the disease, particularly that of the more localized type, beginning as it usually does at the ileocecal region, may be and frequently is seen in the absence of tuberculosis in the lungs. I think that this was probably a very diffuse process, which should have been recognizable by proctoscopic examination. In such a case an advanced pulmonary process would or-

dinarily be found. I do not know enough about the tuberculin test to be sure of the significance of a negative test with a 1:20,000 dilution; to use it would help some to make the diagnosis of tuberculosis of the bowel unlikely.

I am not quite convinced, even though Dr. Jones has tried to persuade me, that this process was limited to the right side of the colon. I did not dare ask Dr. Holmes this question for fear he would discourage me. I have the feeling, however, that if one puts a little barium in the bowel and it is promptly pushed out, one has the right to suspect a little irritation on the left side of the bowel. Therefore, I am not sure but that we have a process here which involved most extensively the right colon, and to a slight degree the remainder of the bowel, including the rectum and the terminal ileum. If that is in any degree a proper interpretation it seems to me that it pretty nearly forces us into a diagnosis of chronic idiopathic ulcerative colitis. It is difficult for me to see how a process as extensive as this could fall into the type of tuberculosis associated with a negative chest plate and a negative tuberculin test. While chronic ulcerative colitis usually begins in the rectum and progresses toward the cecum, it does in certain cases begin in the right side and may be more or less localized. I am therefore content with a diagnosis of chronic idiopathic ulcerative colitis.

Dr. Jones: There were two or three unusual points in the story that are not brought out in the typewritten report. One was that it was absolutely impossible to obtain confirmation of the initial blood in the stools. On repeated asking she always said, "No." Another interesting point was, as I recall it, that her pain was discomfort in relation to bowel movements; it was always near McBurney's point, and it was the type of thing we are apt to get more with regional ileitis than with ulcerative colitis. Furthermore, it is most unusual to have a patient who is as sick as this patient obviously was, who has a diarrhea as intractable as that which she presented and as much colonic irritation, evidenced, as Dr. McKittrick has pointed out, by inability to hold a barium enema, and who still gives a negative guaiac test day after day. The appearance of the rectum by proctoscope was of the type that I always associate with irritation rather than actual disease, because you do get the same appearance from repeated enemas. I have seen it at least six times in regional ileitis and many times in other diseases that cause diarrhea and frequent bowel movements. It was obvious that there was colonic disease higher up, and my recollection is that Dr. Hampton stressed the possibility, but not the probability, of ulcerative colitis with a spread into the ileum and down the colon. The other points have all been brought out by Dr. McKittrick. She received emetin because we thought that this was something queer, that it was not ulcerative colitis and that it was only fair to give the drug a therapeutic trial. The response was as unsatisfactory as we expected that it would be. Because of the failure to relieve the condition by any direct form of medical treatment, some form of surgery seemed the only proper method of procedure.

Dr. Sowles: Dr. McKittrick's evaluation of the history was very clear and logical. We went through approximately the same reasoning as he did, with the exception that we did not put so much stress on ulcerative colitis; we explored with a tentative diagnosis of tuberculosis. At the time of operation the last 25 or 30 cm. of cecum and transverse colon were very edematous and thick, with acutely swollen nodes in the mesentery. The sigmoid was normal to palpation, and by direct vision of the bowel we made a diagnosis of regional enteritis and did an anastomosis of the ileum — 25 or 30 cm. above the ileocecal valve — to the apparently normal sigmoid. She died of malnutrition about fifteen or sixteen days postoperatively, and I think Dr. Mallory will tell you that the correct diagnosis agrees with that of Dr. McKittrick.

Clinical Diagnosis

Regional enteritis.

Dr. McKittrick's Diagnosis

Chronic idiopathic ulcerative colitis.

Anatomical Diagnoses

Idiopathic ulcerative colitis, acute and chronic, with involvement of ileum.
Peritonitis, acute, localized.
Sepsis of operative wound.
Ileosigmoidostomy.

Pathological Discussion

Dr. Tracy B. Mallory: This case brings up the question of our ability to differentiate chronic ulcerative colitis and regional ileitis on anatomical and histological grounds. Since the etiology of both diseases is completely unknown this can only be done on the basis of the morphological picture, and how much reliance we can put on that is a little uncertain. It is well known that ulcerative colitis may spread upward to involve the terminal ileum. It is claimed that regional ileitis may spread downward and involve the colon. Hence distribution of gross lesions does not settle the problem.

The histological picture of chronic ulcerative colitis is not characteristic. One sees multiple areas of ulceration, sometimes isolated, sometimes confluent, deep in the mucosa, occasionally extending down into the muscularis, with polypoid hyperplasia of the intervening islands of intact epithelium and a very marked inflammatory reaction. Even in the more acute stages enormous numbers of lymphocytes and plasma cells are present, intermingled with polymorphonuclears and eosinophils, and even in the chronic stages polymorphonuclears usually persist. In regional ileitis, on the other hand, although a similar non-specific inflammatory picture predominates, one does find in the majority of cases if one searches for a little while, and sometimes very easily in every section, lesions that are relatively specific; there are small focal collections of epithelioid and giant cells which sometimes simulate those seen in tuberculosis but ordinarily are less closely aggregated. Similar lesions may be found in the mesenteric nodes and never show caseation, and no one has ever succeeded in demonstrating tubercle bacilli in them. I have seen occasional cases of presumable regional ileitis where no such foci could be found, so I question whether they can always be counted on.

In this case both the gross and microscopic pictures in the colon were perfectly characteristic of an ordinary ulcerative colitis. The process in the ileum was similar, and no foci of epithelioid cells were found. The mesenteric nodes were negative.

Dr. McKittrick: Was there any slough over the ulcerations?

Dr. Mallory: There was not much slough, but there were definite acute ulcerations. The ulcers in the colon extended down to the rectosigmoid, and if Dr. Jones could have inserted the proctoscope 2 or 3 cm. farther he would have seen an ulcer.

Dr. Jones: There was one thing that came out at autopsy that might be mentioned: there was a fresh ulceration going across a suture line. In other words the disease was rapidly progressing.

CASE 25372

Presentation of Case

An eleven-year-old boy was admitted to the Massachusetts Eye and Ear Infirmary for swelling of the right eye and edema of the forehead of thirty-six hours' duration.

Three years previously, the boy had been a patient for over a year at a tuberculosis hospital where a diagnosis of malnutrition was made; a tuberculin test was negative. His intelligence quotient was 0.73. For several days before admission the patient had a mild upper respiratory infection. On the day before entry his right eyelids began to swell and become red; he was restless and lost his appetite. On the day of entry, the swelling extended toward the other eye and over the forehead to the hairline. There was no vomiting, headache or dizziness. The patient being a state ward, no family history was available.

Physical examination revealed a poorly developed and nourished boy with hollow cheeks, lying listlessly in bed. The skin was pale and dry. There was marked swelling and redness of the right eyelid and between the eyes extending over the forehead. There was tenderness over the frontal and maxillary regions. The eyes showed normal movements; the corneas were clear; the pupils reacted briskly to light; the fundi were normal. The throat was very red; the tonsils had been removed; there was a thick yellow postnasal discharge. The cervical lymph nodes were enlarged, the axillary and inguinal ones slightly palpable. The ear drums appeared normal. Examination of the lungs showed diminished breath sounds on the left and no rales. The heart was not enlarged, and there was a diffuse mild systolic murmur over the entire precordium. The abdomen was firm and not tender. The knee jerks were sluggish. The neck was not stiff. The Kernig sign was negative.

The temperature was 103°F., the pulse 108, and the respirations 22.

X-ray examination showed a right pansinusitis and pus in the left frontal sinus. There was no bone destruction. The chest was clear.

Examination of the blood showed a white-cell count of 22,800 with 90 per cent polymorphonuclears and 70 per cent hemoglobin. The urine was normal. A blood Hinton test was positive, a Wassermann test negative. A nasal culture showed *Staphylococcus aureus,* and a throat culture a hemolytic streptococcus.

On the second day an incision was made into the right orbit between the nasion and inner canthus. Pus was found over the paper plate of the ethmoid, and a drain was inserted. The temperature fell to 99°F., did not go above 100° for one week, and then rose to 101.5°, with a daily swing. An x-ray film showed the right ethmoid full of pus, without evidence of osteomyelitis, and the antrum clearing. Two weeks after the operation, reinvestigation of the wound was made under anesthesia and no obstruction to drainage or osteomyelitis was found. The fever persisted and five days later a lumbar puncture showed a pressure of 310 mm. of water, active reaction to jugular pressure, a clear fluid (71 cells per cubic millimeter, with 30 per cent polymorphonuclears), a protein of 50 mg. per 100 cc. and a gold-sol curve of 0001210000; the Wassermann test was negative.

Four days later an external right ethmoidectomy was performed, with removal of the right middle turbinate.

In spite of good healing of the operative wound, the child did badly during the next few weeks. He refused to eat, became very emaciated and was drowsy and unco-operative. The neck was stiff, and the Kernig sign positive. A *tache cérébrale* was present. The eye grounds showed myopia, distended veins and questionable slight swelling of the nerve heads; there was no choroiditis. The temperature was normal, except for rare transitory elevations.

The child was put on gavage feeding. The blood showed a white-cell count of 19,000. A lumbar puncture during the fourth week showed clear fluid (7 cells per cubic millimeter, all lymphocytes), with a pressure of 410 mm.; the protein was 64 mg. per 100 cc., the sugar 83 mg., and the gold-sol curve 5454431100. Another the following week showed very little change. An x-ray film of the chest showed infiltration of the left apex.

One week later the child was still very drowsy but retaining feedings. An x-ray film of the skull showed osteomyelitis in the midline above the frontal sinus. The following day, thirty-seven days after admission, he died.

Differential Diagnosis

Dr. James B. Ayer: The condition on admission was consistent with a virulent acute pansinusitis, which indeed was shown by x-ray. I see no good evidence for primary infection elsewhere, although a septicemia cannot be excluded. At that time there was no indication of intracranial infection or of a cavernous-sinus thrombosis.

The pus that was found presumably came from the right ethmoidal cells, and the infection was probably due to the *Staphylococcus aureus* that was obtained by culture from the nose. Although drainage was established, two weeks later there must have been symptoms to suggest central-nervous-system invasion, for a lumbar puncture was performed which showed definite elevation of pressure and what I interpret as the findings of an aseptic meningitis. This apparently led to a more thorough effort to drain the infected ethmoid cells.

After a few weeks there was improvement in the local infection, but signs of meningitis and of increased intracranial pressure, and then late in the course of the nasal infection and only just before death there was x-ray evidence of osteomyelitis of the frontal bone and also of pneumonia.

The sequence of events and time relations are typical of infection of the brain from ethmoid or frontal-sinus infection. I should recapitulate as follows: nasal infection followed by pansinusitis; ethmoid cells broken down and early epidural infection via the cribriform plate; spreading of epidural infection in the anterior fossa associated with osteomyelitis of the frontal bone, occurring much earlier than shown by x-ray; finally, frontal lobe abscess (right?) by direct extension from an epidural abscess.

The positive Hinton test and the low IQ test in a foundling suggest the possibility of congenital syphilis, which might have a bearing on the patient's susceptibility to nasal infection. My diagnoses are: epidural abscess with probably right frontal lobe abscess due to *Staphylococcus aureus;* pansinusitis; early pneumonia; septicemia (?) and congenital syphilis (?).

Dr. Alexander S. MacMillan: The films taken on admission show this very definite right pansinusitis. The right side of the nose is completely blocked. The ethmoid, frontal and small ethmoid sinuses are full of pus, and so is the antrum. With that finding and swelling over the forehead, repeated x-rays were taken in an attempt to establish a diagnosis of osteomyelitis over the frontal sinus. It was not until about three weeks later, however, that a lateral view of the skull showed beginning decalcification of the overlying bone. In all this time the ethmoid cells remained filled with pus, although the antrum itself drained completely. In the anteroposterior view there is this definite dark area, which you can see from a distance. That is entirely different from the appearance of the bone when the patient first came in. It is quite characteristic of osteomyelitis of the frontal bone. The films of the chest show an area in the left apex that is consistent with tuberculosis.

Dr. Ayer: I had ruled out the tuberculosis because of the negative tuberculin test and the course of the illness. In spite of the x-ray evidence of tuberculosis I still discount this disease as accounting for the major symptoms.

Dr. Harold L. Higgins: This case was presented on rounds as that of a child whose ethmoid infection was responding very well and yet who was going downhill. As he lay there almost comatose one could not help thinking of two things: juvenile paresis and marked tuberculosis, probably tuberculous meningitis. Clinically we played with these two diagnoses for some time before we gave them up. Against the juvenile paresis were the facts that the eyes responded very well to light, that the child did not have an enlarged spleen and that there was no other sign of syphilis except mental deficiency. The findings of the first lumbar puncture were quite in keeping with tuberculous meningitis in the early stages, but we felt

that those of the subsequent lumbar punctures, where the cell counts had diminished, ruled out this disease and that possibly tuberculoma was the correct diagnosis.

Clinical Diagnoses

Right pansinusitis, ? quiescent.
Tuberculosis.
Malnutrition.

Dr. Ayer's Diagnoses

Epidural abscess, with probably right frontal lobe abscess due to *Staphylococcus aureus.*
Pansinusitis.
Early pneumonia.
Septicemia?
Congenital syphilis?

Anatomical Diagnoses

Pansinusitis, acute.
Osteomyelitis, frontal bone.
Perforation, posterior wall, left frontal sinus.
Cerebral herniation through right cribriform plate.
Brain abscesses, bilateral, frontal lobes.
Pulmonary tuberculosis, apical.

Pathological Discussion

Dr. Charles S. Kubik: There was pus in the frontal sinuses and ethmoid cells, and the osteomyelitis which you already know about. In the posterior wall of the left frontal sinus there was a perforation, and behind that, between the bone and the dura, a layer of granulation tissue. There were two abscesses, one in each frontal lobe. These were just beneath the surface and had fairly resistant capsules, consistent, I should say, with the duration of symptoms.

Was there a culture made at autopsy?

Dr. Tracy B. Mallory: Yes, directly from the brain abscess; it showed a hemolytic streptococcus.

Dr. Kubik: Cocci, in long chains, were found in sections of the walls of the abscesses.

Dr. Mallory: The rest of the body showed virtually nothing. The cultures from the heart's blood were sterile. We found three or four very small tubercles, 3 or 4 mm. in diameter, at the apex of one lung.

Dr. J. H. Means: I should like to ask Dr. Kubik about the pathway of entry of the organisms to the frontal lobes. Was there any direct communication between the frontal lobe and the sinuses?

Dr. Kubik: I am not sure that I can answer that. The infection was easily traced from the sinus, through the perforation, to the epidural space. The dura however appeared to be intact, and there was a thin shell of brain tissue between the abscess and the meninges. Such infections cross the subarachnoid space without producing a generalized meningitis, although there is usually, if not always, a local meningitis.

A large proportion of brain abscesses complicating otitis and mastoiditis follow thrombophlebitis of the lateral sinus, and it is thought that retrograde infection of small cerebral veins which empty into the sinus may account for the abscess. In this case, however, as in most frontal abscesses, there was no infection of the superior longitudinal sinus. We say that the infection has been by "direct extension" and usually let it go at that. It may be that in these cases too the infection follows very small veins, first through the dura and then across the subarachnoid space and into the substance of the brain.

Dr. Mallory: In this case, direct infection seems probable for one of these abscesses, that on the left, which lay directly behind a perforated frontal sinus. On the other side, however, the posterior wall of the sinus was intact and yet there was also an abscess behind it.

Dr. Kubik: One thing I failed to mention was a defect of the cribriform plate on that side. It is possible that this was the source of the abscess in the right frontal lobe.

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THE "TOTAL PUSH" TREATMENT OF CHRONIC SCHIZOPHRENIA

It has long been thought that actual hospitalization of patients with schizophrenia tends, in one sense, to add to their difficulties by overlaying their fundamental retreat from social contact into a delusional state with a "prison stupor" or a new psychosis. This untoward action has been the concern of every hospital superintendent for many years, and attempts have been made in the past to so order hospital life that the idea of continued isolation is kept at a minimum. This, however, has not been by any means successful, as immediately a patient enters an institution for mental disease almost all his initiative is taken from him. His social contacts are even more diminished, and he becomes entirely passive to his activities. He is immersed in monotony and, perhaps most important, he lives in a motivation vacuum; that is, rewards and punishments disappear from his life and he is neither praised nor blamed for his conduct. Life in the hospital not only furnishes a psychological retreat but also results in a physiological vacuum. It is difficult, at best, to provide adequate exercise, particularly out-of-doors, in any institution, especially for patients who are unwilling to work and have no inclination toward such activity.

Although all this was well recognized, only recently has there been set forth a definite plan to overcome these undesirable factors in the treatment of patients with chronic schizophrenia. Myerson[1] has suggested an amplification and synthesis of the well-known methods of treatment of the chronic schizophrenic patient, the complete plan being called the "total push" method. The general medical measures include physiotherapy and irradiation with ultra-violet rays, exercise and games are greatly extended, the diet is made more adequate, vitamins being added, and an effort is made to increase the patient's self-respect. Care is taken to insist that the patient dress, shave himself and take care of his hair. Some sort of punishment or deprivation is introduced if patients do not properly care for themselves. Every effort is made to praise or blame and to give just rewards or punishments.

The results of this treatment of schizophrenia have been gratifying. Part of the work has been carried on at the Boston State Hospital, but more recently a large number of patients have been under "total push" treatment at the McLean Hospital. Tillotson[2] reports on eleven of these patients, who had been ill on an average of over twelve years and whose average hospitalization was over ten years. As a result of the treatment, none of the patients were worse and many showed definite improvement. There was a better contact with reality, and the patients showed increasing social responsiveness, general activities, skill and co-ordination, and improved mood, with some degree of improvement in their physical status. One of the patients improved to such an extent in his social status that a program of re-

education was begun and satisfactory progress is recorded. Tillotson concludes that "if insulin and metrazol therapy are used, the total push method should be instituted in its fullest sense as an important adjunct." It is offered, however, "as a distinct method of organized, intensive, individual activation in chronic schizophrenia." In the hands of both Myerson and Tillotson this method appears to have been successful, although the time elapsed since the method was first tried is too short to give complete evaluation.

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THE PUBLIC ASKS ABOUT HEALTH

THE average citizen, despite his prejudices, entertains an inherent belief in and respect for the integrity and capabilities of his government's agencies. He is inclined to credit them, in fact, with a general, if embarrassing, omniscience, and may be not too patient with their failures to live up to this reputation. No bureau, division, office, department, commission, section or service of the federal government, according to a Treasury Department release, but receives its daily grist of queries by mail, and the United States Public Health Service has never been slighted by lack of inquiring letters.

A cross section of this "fan mail" has recently been analyzed by Dr. Robert Olesen, assistant surgeon general, to show the type of question that people ask about health. While epidemics, public discussion of medical-care problems, announcements of new methods of treatment, and illnesses of prominent persons release a flood of inquiries, comments and suggestions and questions of general health come in at a fairly even rate.

A sample is given of the types of information requested: "Susceptibility of a person to rabbit fever; dirt eating; how to get rid of germ-phobia; recent discoveries in the medical world; spectacles for the blind; how to preserve life; garlic — twenty questions on its medical use; bacteria on coins; cure for cigarette habit; most healthful regions of the United States; use of bone and dried chicken gizzard for treatment of cataract; effects of eating tung nuts; health value of barracuda; eating poison-ivy leaves as a preventive; method of eliminating scars; embalming fluids; what is thyphen; therapeutic uses of radio, and so forth."

Replies are prepared not only from the resources of the United States Public Health Service, including approximately 2000 reprints from *Public Health Reports* and some 400 multigraphed statements, but other federal and voluntary agencies, and occasionally medical specialists are consulted. Many of the questions proposed are of course unanswerable.

Most of the frequent letters presenting "cure-alls" have common characteristics. They usually come from ignorant individuals, many of them elderly men and women; the cures are "quick in action, low in cost, immediate in relief, and permanent in their results"; they are applicable to a number of ailments. Moreover, the discoverers of the cures are almost unanimous in their willingness to receive a substantial reward, frequently varying from $100,000 to $1,000,000, for their proposed service to mankind.

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ARTHUR THORNTON LEGG

1874–1939

The sudden death of Dr. Arthur Thornton Legg on July 8, 1939, has brought a sense of personal loss to a surprisingly large number of physicians and patients, and to many medical groups — surprising, because we have rarely known a medical servant endowed with a superior mental equipment and capacity for friendship who was so completely self-effacing.

Dr. Legg was born in Chelsea, Massachusetts, on April 19, 1874, to Charles Edmund and Emily (Harding) Legg, and is survived by one brother, Allen H. Legg, of Chelsea. After graduation from the Chelsea High School in 1894, he entered Harvard College and after two years in premedical studies was admitted to the Harvard Medical School, graduating in 1900. His orthopedic internship was taken at the Boston Children's Hospital which he continued to serve in increasingly important staff positions until his death, at which time he was assistant professor of orthopedic surgery at the Harvard Medical School, surgeon to

the Children's Hospital and chief of the Harvard Infantile Paralysis Commission Clinic. For several years he was also on the staff of the Orthopedic Clinic of the Carney Hospital, being one of that small band of young orthopedic surgeons who pioneered under the leadership of Dr. Joel E. Goldthwait in establishing what we believe was the first orthopedic clinic for adults in the United States. He was consulting orthopedic surgeon to the Chelsea Memorial Hospital, the Lakeville Sanatorium and the Massachusetts State Hospital at Canton. He was a member of the Advisory Council of the Georgia Warm Springs Foundation. When the state clinics for crippled children were established under the provisions of the Social Security Act he was placed in charge of the Haverhill Clinic.

Dr. Legg's medical affiliations were many and included membership in the Massachusetts Medical Society, the American Medical Association, the American College of Surgeons, the American Orthopaedic Association, the American Academy of Orthopaedic Surgeons, the Boston and Interurban Orthopaedic clubs, the American Pediatric Society and the Society of Sigma Xi. He was also elected to membership in the International Society of Orthopaedic and Traumatological Surgery but declined the honor. His social affiliations were few. The Harvard Club of Boston knew him well for many years, and he was a member of the Star of Bethlehem Lodge of Masons in Chelsea. At one time he was a member of the Vesper Country Club. During the World War he was kept in this country as an essential teacher and serving under Major Robert W. Lovett, did yeoman work in fitting younger surgeons for service in army hospitals in Europe and America. The woods and the shore often called him, in companionship most often with his brother or with Dr. Edwin Wyman.

For many years a seemingly self-sufficient bachelor, Dr. Legg was married on August 27, 1936, to Miss Marie Robinson, who was in charge of the private ward of the Boston Children's Hospital. They traveled together to Labrador to the Grenfell Mission, with which his wife had been at one time connected. The sadness of her untimely death on May 24, 1938, left a wound which those who knew him intimately realized would never heal, although he bravely and efficiently continued to meet his many medical responsibilities.

Dr. Legg's contributions to medical literature numbered twenty-two, and he never wrote unless he had something worth while to put on paper. The careful study of a series of cases of hip disease in children, published in February, 1910, brought him international recognition. He was the first to recognize and demonstrate that the patients whose symptoms he described were not suffering from tuberculosis of the hip joint but from a deformity of growth at the epiphyseal line. Although farthest from his thought or wish, the osteochondritis juvenilis or coxa plana which he first described became more generally known as Legg's disease in this country, and his name is commonly linked with those of Calvé in France and Perthes in Germany, who quite independently described the same syndrome. Some of his most important contributions were as follows:

The cause of atrophy in joint diseases. Am. J. Orthopaedic Surg. *6*:84-90, 1908.

The importance of the early recognition of acute arthritis of the hip-joint in infants. Boston M. & S. J. *170*:527, 1914.

Tendon transplantation, conclusions from a study of one hundred cases. Interstate M. J. *23*:333-336, 1916. (With Dr. F. R. Ober.)

Remarks on the etiology of the flattening of the upper femoral epiphysis: a study of seventy-five personally observed cases. Am. J. Orthopaedic Surg. *16*:448-452, 1918.

Transplantation of tensor fasciae femoris in cases of weakened gluteus medius. J. A. M. A. *80*:242, 1923.

Review of the treatment of infantile paralysis after the acute stage. J. Bone & Joint Surg. *6*:194-203, 1924.

The end results of coxa plana. J. Bone & Joint Surg. *9*:26-34, 1927.

An analysis of the 1935 epidemic of infantile paralysis in Massachusetts. New Eng. J. Med. *217*:507-511, 1937.

We have referred to Dr. Legg's outstanding characteristics, the most admirable of which were his devotion to the needs of the crippled child, his reserve and his modesty. His own father complained of the necessity of "pumping" him before he could learn either of his doings or his thinkings. Toward this father, crippled by rheumatism for many years before his death in 1914, the son exhibited a remarkable devotion and tenderness. Although his days in town were very full he slept at night at his father's home in Chelsea in order that he might constantly minister to the needs of his widowed parent's body and spirit. At the chance sight of a crippled child while he was driving in an automobile, the car was stopped while he sought to find the cause. He was an able, careful surgeon who often called attention to his mistakes but rarely to his many successes. His diagnostic skill was extraordinarily keen, and his therapeutic judgment wise and kindly. As chief of the Harvard Infantile Paralysis Commission Clinic in Boston and of the many subsidiary clinics in different parts of the State, he not only showed marked organizing ability but had the

faculty of commanding the devotion and winning the affection of his subordinates. Though he held strong opinions he consistently refused to be controversial. He belonged to that small group of useful men who are undemanding, pleasant in companionship and seemingly quite unaware of the sterling nature of their own admirable attributes.

R. B. O.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
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INVERSION OF THE UTERUS — A REVIEW

On June 22, 1939, the first article on inversion of the uterus appeared in the *Journal*. Actual case reports of this complication have appeared in each issue up to and including the September 7 number. It seems worthwhile to record the impressions of this condition as represented in these twelve cases.

In the first place, the ease with which these cases have been collected would lead one to infer that it is not the extremely rare condition that it has always been thought to be. Nothing of value can be deduced as to the etiology of the condition. Inversion of the uterus appeared as a complication associated with both normal and operative labors. It happened where there had been no undue attempts at manipulation by the Credé method; however, in one or two cases the possibility of too forceful manual attempts at placental extrusion might have been predisposing factors. There was one case in which the cord was extremely short, but such a finding is not uncommon without this complication. It was thought that the indiscriminate use of posterior pituitary extract might have played an etiologic part in one case, but no definite conclusion could be drawn. Some of these cases were associated with adherent placentas but in others this condition was not present.

Hemorrhage was not constant, and although shock associated with the reposition of the uterus was present in some cases, it was not a constant symptom. Sepsis was not invariable.

The only striking feature that review of these cases reveals is that immediate diagnosis and immediate reposition of the inverted uterus lend to simplicity in treatment and smoothness in convalescence. Where sudden hemorrhage is a marked symptom, its cause must be immediately determined and corrected; when this is done under careful asepsis, the reposition of the uterus is a simple matter.

Among this series were several cases of chronic inversion, some with and others without sepsis. The treatment of chronic inversion depends on whether sepsis is present and on the judgment of the individual operator. In some cases of chronic inversion the uterus may be successfully replaced by a vaginal operation; in others hysterectomy is required.

If inversions of the uterus are immediately diagnosed, transfusions given when indicated and the uteri manually replaced, mortality from this condition should be very low.

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

DEATHS

DAVIS—ERNEST L. DAVIS, M.D., of Springfield, died September 10. He was in his sixty-eighth year.

Dr. Davis received his degree from Tufts College Medical School in 1906 and held fellowships in the Massachusetts Medical Society and the American Medical Association. He was a member of the American Roentgen Ray Society, the New England Roentgen Ray Society and a former president of the Springfield Academy of Medicine.

HOWARD — CHARLES T. HOWARD, M.D., of Hingham, died September 6. He was in his sixty-ninth year.

A native of Hingham, he attended Adams Academy, Quincy, and entered Harvard University with the class of 1895. He received his degree from Boston University School of Medicine in 1898. Dr. Howard began practice in Watertown shortly after graduating from medical school and later moved to Hingham.

He was a fellow of the Massachusetts Medical Society, the American Medical Association and the American College of Surgeons, and was a member of the Massachusetts Homeopathic Medical Society. Dr. Howard was professor emeritus of surgery at Boston University School of Medicine, and was former surgeon-in-chief of the Massachusetts Memorial Hospitals.

His widow, three daughters and two sons, survive him.

MISCELLANY

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR JUNE, 1939

DISEASES	JUNE 1939	JUNE 1938	FIVE-YEAR AVERAGE*
Anterior poliomyelitis	3	1	5
Chickenpox	850	1286	1178
Diphtheria	8	5	22
Dog bite	1647	1410	1333
Dysentery, bacillary	1	38	12
German measles	75	79	1381
Gonorrhea	415	337	461
Lobar pneumonia	236	293	278
Measles	3927	2216	2700
Meningococcus meningitis	5	4	8
Mumps	501	877	689
Paratyphoid B fever	7	2	10
Scarlet fever	441	1164	816
Syphilis	417	412	438
Tuberculosis, pulmonary	285	383	319
Tuberculosis, other forms	37	46	39
Typhoid fever	10	2	6
Undulant fever	4	4	3
Whooping cough	551	477	639

*Based on figures for preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from: Newton, 1; Somerville, 1; Quincy, 1; total, 3.

Diphtheria was reported from: Boston, 3; Lawrence, 1; Lynn, 3; Waltham, 1; total, 8.

Dysentery, bacillary, was reported from: Haverhill, 1; total, 1.

Infectious encephalitis was reported from: Braintree, 1; Brockton, 1; total, 2.

Meningococcus meningitis was reported from: Boston, 1; Cambridge, 1; Dudley, 1; Lowell, 1; Worcester, 1; total, 5.

Pfeiffer bacillus meningitis was reported from: Lowell, 1; total, 1.

Paratyphoid B fever was reported from: Boston, 2; Concord, 1; Malden, 1; Medford, 1; Pittsfield, 1; Plymouth, 1; total, 7.

Pellagra was reported from: Chelsea, 1; Easthampton, 1; Waltham, 1; total, 3.

Rocky Mountain spotted fever was reported from: Chatham, 1; total, 1.

Septic sore throat was reported from: Boston, 3; Lawrence, 1; Millbury, 1; Quincy, 1; Somerville, 1; total, 7.

Tetanus was reported from: New Bedford, 1; total, 1.

Trachoma was reported from: Boston, 3; Malden, 1; total, 4.

Trichinosis was reported from: Boston, 2; total, 2.

Typhoid fever was reported from: Attleboro, 1; Boston, 1 (student in Boston, home in Pittsfield); Brockton, 3; Brookline, 1; Cambridge, 1; Chicopee, 1; Dartmouth, 1; Reading, 1; total, 10.

Undulant fever was reported from: Gardner, 3; Monterey, 1; total, 4.

The reported incidences of anterior poliomyelitis, infectious encephalitis, and meningococcus meningitis were not remarkable.

Typhoid and paratyphoid B fevers showed the usual seasonal increase within expected limits.

Diphtheria had a reported incidence for the month lower than the average for one day in 1929.

Dog bite continued to be reported in record high figures, although for the third consecutive month there were no cases of canine rabies.

Scarlet fever, lobar pneumonia, chickenpox, mumps, and German measles were reported below the five-year average.

Measles, although showing an expected decrease under the previous month, was reported above the five-year average.

Pulmonary tuberculosis and tuberculosis (other forms) continued to be reported in encouragingly low levels.

The reported incidence of whooping cough was not remarkable.

PROPOSALS FOR AMENDMENT OF THE WAGNER BILL (S. 1620)

On August 15, 1939, The Committee of Physicians for the Improvement of Medical Care issued a statement concerning proposed amendments to the Wagner Bill (S. 1620). The following is a reprint of the statement, with certain deletions.

* * *

The national movement for improvement of health services and provision of better medical care for the people, which has been gaining force in the last years, has now reached a point where legislation is pending. Hearings before the Senate subcommittee have been held on the Wagner Bill which was the subject of the last statement issued by the Committee on May 5, 1939. The bill has received the general support of consumer groups (labor, farm, women's organizations, and so forth) and has been subjected to criticism, sympathetic and otherwise, by professional groups of all kinds. The subcommittee of the Senate Committee on Education and Labor, before which these hearings were held, has submitted a report. In this report it is stated: "The committee will continue its study of S. 1620 so that a definitive report on the proposed legislation can be submitted soon after the beginning of the next session of Congress." In addition, to quote from another section: "We do not at this time have solutions for all the problems which have developed in the study of the bill, but we are confident that solutions will be found as we proceed with our study and as we continue to receive critical advice and assistance which we welcome from public and professional groups and individuals who have assured us of their co-operation." In the light of these hearings and this report it is not only possible but necessary to take a more concrete position on this bill and other legislation which may be proposed.

The Committee of Physicians wishes to assert its sympathy with the general purposes of the Wagner Bill and with the program of the Technical Committee, upon which the bill is based. It appreciates the attitude with which the Senate subcommittee conducted the hearings, the interest and receptiveness which its members displayed, the lack of prejudice which characterizes their analysis of the problem under consideration and the evidence which was presented to them, and the intelligent open-mindedness of the comments and conclusions of their report. The Committee of Physicians recognizes that certain compromises were made in this first legislative draft to meet objections that had been raised against the Technical Committee's program and to bring its proposals into conformity with the existing complex federal machinery entrusted with the administration of health. The hearings have demonstrated that these compromises have achieved no useful purposes and that they may jeopardize some of the most desirable aims of health legislation, especially the continuous improvement of the quality of medical care. The Committee of Physicians, therefore, recommends that the Wagner Bill (S. 1620) be amended or redrafted in conformity with the suggestions presented in this statement.

GENERAL PRINCIPLES

1. There can be no doubt of the fact that good medical care is not now available to a large portion of the population of the United States. This has been satisfactorily established by repeated surveys, including that of the U. S Public Health Service, which was the basis of the Technical Committee's report before the National Health Conference. It has been supported by the testimony of representative members of the medical profession as given in the American Foundation's report *American Medicine* (1937). The existence of this medical need was not challenged in the National Health Conference held in July, 1938, under the auspices of the Interdepartmental Committee.

2. There can be no doubt that if good medical care is to be given to the people of this nation, the government (local, state and federal) must assist in devising programs and sharing the expense. Many of the states are likely to be unable successfully to finance improved medical care for their people. Experience has demonstrated that federal participation can best be effected by grants-in-aid to the states, carefully protected by the establishment of standards which must be met by the states in order that they may qualify for the receipt of grants. Although for the sake of co-ordination and to prevent abuses, these pre-

rogatives should be retained by the federal government, responsibility for the institution and administration of programs should reside in the states as the Wagner Bill provides. In utilizing these two principles, the Wagner Bill is sound.

3. The provision of moneys by the federal government to assist in medical care at once involves the Government in the setting up of suitable machinery to see that the moneys so appropriated are expended in such a way as not only to improve the medical care offered to the people, but to maintain and improve the standards of the institutions and individuals participating in this care. Only by insistence upon this principle can the prudent use of public moneys be guaranteed. Although provisions for this purpose are included in every title of the Wagner Bill, there are certain features in these titles and in the bill as a whole that militate against the achievement of these objectives, namely:

I. Divided control in the planning and execution of the program is incompatible with any sound program for national health. There should be unified federal health authority.

II. As a corollary to this there should also be a General Health Council. This council should have authority to establish and enforce professional standards in order to insure a good quality of medical care. The constitution of the Council should be defined in the bill.

III. The establishment of the unified health authority and the General Health Council should be the first step taken in connection with the institution of a national health program.

IV. Although special measures, such as those contained in Titles V, VI, and XII [those concerning maternal and child health, public-health work, and hospitals and health centers] of the Wagner Bill may be expedient, the objective should be to provide in every community a unified program of health service and medical care which will meet the standards approved by the General Health Council.

V. The lack of provision for support of medical education and research may cut the ground from under good medical practice. The achievement and maintenance of high standards of medical education and research require additional funds.

SPECIFIC PROPOSALS

1. There must be a unified federal authority responsible for the institution and execution of all parts of the Health Program. . . .

2. A General Health Council should be established which shall have the power to define and supervise standards of medical education, research and care whenever it is proposed to make federal grants-in-aid and these shall not be made without its approval. . . .

a. The Surgeon General of the United States Public Health Service should be the chairman and executive officer of the General Health Council.

b. Appointments to the General Health Council should be made by the President with the advice and consent of the Senate in such a manner that representation of special interests would be subordinated to the more important point of assembling outstanding persons with imagination, intelligence, critical judgment, and expert knowledge in public health and medicine.

c. The Council should be composed of eight persons in addition to the executive officer, a majority of whom should hold degrees of Doctor of Medicine.

d. The term of office should be sufficiently long to permit members of the Council to look upon their membership as a career. If the term of office is specified, it should be provided that members may be reappointed when their terms expire.

e. Members of the General Health Council should give full-time service. Remuneration for these services must therefore be generous enough to attract persons of highest quality.

f. The Council will be charged with defining and supervising the standards of all institutions and services aided by federal grants. . . .

g. Whenever the Council finds, after reasonable notice and opportunity for hearing to the state agency concerned, that there has been a failure on the part of such agency to comply substantially with any requirements of the Council, the Council shall recommend no further payments to such state for that purpose until it has been satisfied that there is no longer any such failure to comply.

h. Scientific and technical subcommittees covering the several fields for which the General Health Council is responsible should be constituted under the authority of the Council to aid in its task of defining and supervising standards. . . .

3. Within a reasonable period of time, the several services provided under the bill should be consolidated in one state health agency. Pending this consolidation, the department of health in each state should be the clearing agency for the federal grants-in-aid made available upon recommendation of the General Health Council. . . .

4. Under the supervision of the General Health Council, provisions should be made to continue present federal health activities, to expand specific activities of proved merit, and to co-ordinate and merge all such activities into a future general program of health service and medical care. . . .

It might be advisable to incorporate certain basic principles in the health legislation.

a. Hospitals or health centers must not be constructed to meet a temporary local condition in a manner or place that will not serve the ultimate purpose of a comprehensive program.

b. They should not be constructed where there are existing facilities, public or private, that are not utilized to their effective capacity, provided that these facilities can be made available at a reasonable cost and provided that these facilities do or can be made to conform to the standards established by the General Health Council.

c. Provision should be made, with proper safeguards for the Government, for the rehabilitation of existing public and private facilities provided that they do or can be made to conform to the standards established by the General Health Council.

d. It is not consistent with good medical practice to deny a large group of physicians access to facilities essential for the practice of good medicine.

As stated in the Committee's last statement, May 5, 1939: "The hospitals must be staffed by qualified physicians and surgeons and no person should be allowed to assume professional obligations for which he has not demonstrated competence. Standards similar to those of the American boards for certification of physicians as specialists might be established. If standards of competence are established as qualifications for appointment to the staffs of these hospitals and centers, every effort should be made to permit

those who can meet these qualifications to participate in the activities of these hospitals and centers and to utilize their facilities. Under the present system, in many communities throughout the country, highly competent young surgeons and specialists are excluded from the local hospitals which, although presumably quasi-public, philanthropic institutions, are controlled by small groups of physicians and surgeons, virtually as personal vested interests. This tends to impair their educational value, to deter physicians from taking full advantage of their facilities, and discourages highly trained men from establishing themselves in practice in these communities."

5. Certain general principles which must govern the constitution of general programs for medical care should be incorporated in the bill.

a. If a program to provide care for the medically needy is to function, it must be predicated upon the total population requiring service, with payment estimated on a per capita basis. . . .

b. No arbitrary limitations should be placed upon the states in determining the groups of the population that may be included in these programs or the methods that may be employed to finance these programs. . . .

c. An integrated program of health service and medical care should include: adequate public-health services under competent control; the services of an individual physician, including office and home care; co-ordinated services of specialists and consultants with reference to the patient; availability of modern diagnostic and therapeutic facilities, including hospitalization when needed. . . .

6. Federal grants-in-aid to states for disability benefits should be made contingent upon the establishment of satisfactory provisions for the medical care of the beneficiaries. But the power to pass upon the adequacy of the medical services available to minimize disability among those covered in a state plan and to make allotments of grants-in-aid must rest with the Federal Health Authority acting under the direction of the General Health Council and not with any other board.

7. It is imperative that provisions be made in a special title of the bill for general medical education and research. Grants for these activities should be made by the General Health Council upon direct application from universities, other educational or research institutions and individual investigators, to Federal authority. . . .

NOTE

At a meeting of the Governor and Council held Wednesday, August 23, the appointment of Dr. Frank M. Vaughan, of Boston, to the Board of Registration in Medicine was confirmed. Dr. Vaughan graduated from the Massachusetts College of Osteopathy in 1905 and was appointed to the Board of Registration in Medicine in July, 1923, to fill the vacancy caused by the resignation of Dr. Matthew T. Mayes, of Springfield. In July, 1925, Dr. Vaughan was elected secretary of the Board, and was re-elected secretary each year until the expiration of his term in 1931.

NOTICES

TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10:00 to 12:30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed and, when there is an indication, are treated with radium of high-voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

SUFFOLK CENSORS' MEETING

The censors of the Suffolk District Medical Society will meet for the examination of candidates at the Boston Medical Library, 8 Fenway, Boston, on Thursday, November 2, 1939, at 4:00 p.m.

MILTON H. CLIFFORD, M.D., *Secretary.*

AMERICAN PUBLIC HEALTH ASSOCIATION

Thirty-five hundred health officers, nurses, engineers, school physicians, laboratory directors and other health specialists will attend the sixty-eighth annual meeting of the American Public Health Association and meetings of related organizations in Pittsburgh, Pennsylvania, beginning Sunday, October 15, and ending Friday, October 20.

Every state in the Union, Canada, Cuba, Mexico and many European countries will send their health leaders to participate in a scientific program embracing the official public-health activities of the North American continent.

On Sunday, October 15, the sixth Institute on Public-Health Education begins. The Institute continues on Monday, October 16, and the International Society of Medical Health Officers, the American School Health Association, the Association of Women in Public Health, and the National Organization for Public Health Nursing also meet. Five conference groups convene Monday: state laboratory directors, state sanitary engineers, municipal public-health engineers, directors of local health services and state directors of public-health nursing.

Six general sessions throughout the week will engage the attention of all delegates. "Medical Care," "Cancer," "Professional Education" and "The American Way as Seen from Abroad" are among the subjects chosen for the general assemblies.

The ten sections of the Association have arranged an extensive series of joint and individual meetings covering topics of interest to health officers, laboratory workers, vital statisticians, industrial hygienists, public-health engineers, nutritionists, child hygienists, public-health education experts, epidemiologists and public-health nurses.

Other organizations meeting during the week are the Pennsylvania Public Health Association, the Tri-State Food and Health Officials, the American Social Hygiene Association, Delta Omega and the American Association of State Registration Executives.

Headquarters will be the William Penn Hotel. The preliminary program has been reprinted from the August issue of the *American Journal of Public Health* and may be obtained from the American Public Health Association, 50 West 50th Street, New York City.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, SEPTEMBER 18

TUESDAY, SEPTEMBER 19

•10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

FRIDAY, SEPTEMBER 22

•10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

SATURDAY, SEPTEMBER 23

*10 a.m.–12 m. Staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. Soma Weiss.

*Open to the medical profession.

SEPTEMBER 15–28 — Pan-Pacific Surgical Association. Page 863, issue of November 24.

SEPTEMBER 19 — Lawrence Cancer Clinic. Page 400, issue of September 7.

SEPTEMBER 29–30 — New England Surgical Society. Beverly and Salem.

OCTOBER 13 — Pentucket Association of Physicians. 8:30 p.m., Hotel Bartlett, Haverhill.

OCTOBER 15–20—American Public Health Association. Page 441.

OCTOBER 23–NOVEMBER 3 — New York Academy of Medicine. Page 977, issue of June 8.

FALL, 1939 — Temperature Symposium. Page 218, issue of February 2.

DECEMBER 2 — American Board of Obstetrics and Gynecology. Page 1019, issue of June 15.

JANUARY 6, JUNE 8–11, 1940 — American Board of Obstetrics and Gynecology. Page 160, issue of July 27.

MARCH 7–9, 1940 — The New England Hospital Association. Hotel Statler, Boston.

MAY 14, 1940 — Pharmacopoeial Convention. Page 894, issue of May 25.

JUNE 7–9, 1940 — American Board of Obstetrics and Gynecology. Page 1019, issue of June 15.

DISTRICT MEDICAL SOCIETY

SUFFOLK

NOVEMBER 2 — Censors' meeting. Page 441.

BOOKS RECEIVED FOR REVIEW

Illustrations of Regional Anatomy. E. B. Jamieson. Second edition. Seven sections, 305 pp. Sections I to V inclusive; Edinburgh: E. & S. Livingstone, 1937. Sections VI and VII; Baltimore: The Williams & Wilkins Co., 1939. Complete set, $15.00.

Nitrous Oxide-Oxygen Anesthesia: McKesson–Clement viewpoint and technique. F. W. Clement. 274 pp. Philadelphia: Lea & Febiger, 1939. $4.00.

The New International Clinics: Original contributions: clinics and evaluated reviews of current advances in the medical arts. Edited by George M. Piersol. Vol. 3, N. S. 2. 332 pp. Philadelphia, Montreal and New York: J. B. Lippincott Co., 1939. $3.00.

Brucellosis in Man and Animals. I. Forest Huddleson. 339 pp. New York: The Commonwealth Fund, 1939. $3.50.

The Rectum and Colon. E. Parker Hayden. 434 pp. Philadelphia: Lea & Febiger, 1939. $5.50.

Baptism of the Infant and the Fetus: An outline for the use of doctors and nurses. J. R. Bowen. Fourth edition. 12 pp. Dubuque: The M. J. Knippel Co., 1939. 25c.

BOOK REVIEWS

Medical Microbiology. Kenneth L. Burdon. 763 pp. New York: The Macmillan Co., 1939. $4.50.

The author succeeds in giving a graphic picture of all the different types of micro-organisms that cause disease in man.

The history of their discovery, the proof of their infectiveness, each for a particular disease and their classification, with a scheme of their mutual relations, if any, are set forth in clear and interesting fashion. Then follow chapters on the protozoa, the spirochetes and rickettsiae, the fungi, molds and yeasts and the mold-like higher bacteria, the filterable viruses and the bacteriophages. The true (or lower) bacteria, their classification, how they live, their chemical activities and how they may be killed by physical and chemical means, conclude Part One.

Part Two is devoted to the laboratory study of micro-organisms.

Part Three is headed "Infection and Resistance." It describes how the organisms may get into the body, the reaction of the body to infection, the development of immunity and the use of bacterial products for specific treatment.

Part Four covers the microbiology of important infectious diseases. The latter are arranged chiefly according to the part of the body affected, without regard to the type of organism, although the virus, fungous and protozoan diseases each have a chapter.

Appendices A, B, and C give details of important technical procedures not covered in the text. Appendix D is a list of journals and textbooks that give further information about the various subjects mentioned. Appendix E contains review questions for each chapter, which are very useful for classroom discussion. The index is unusually full and complete. Boldface type is used to indicate pages where may be found the carefully selected illustrations.

The book is an excellent text for students of medicine, dentistry, nursing and public health. It is also a valuable reference book in regard to any infectious disease. The use of this book should give the student of bacteriology a wider outlook and lead him to experiment in some different field, for instance, that of the fungi.

Physiology of the Uterus: With clinical correlations. Samuel R. M. Reynolds. 447 pp. New York and London: Paul B. Hoeber, Inc., 1939. $7.50.

This book gives a very clear presentation of the various physiologic activities of the uterus. It considers one at a time the various changes that occur and why they occur. A description of the motility of the uterus and tubes gives fundamentals which are necessary for the understanding of the further chapters on the changes taking place during various types of stimulation. Considerations of the effect of distention of the uterus and the changes occurring after ovariectomy and supravaginal or total hysterectomy are enlightening. The author enlarges on the physiology of the uterus during pregnancy and clearly discusses the reasons for the onset of labor. The chapters on the vascular and lymphatic supply and that on the innervation are all worthy of careful scrutiny. The metabolism of the uterus is well presented. It is the reviewer's conviction that the clinical correlations are not so well presented as are the discussions of the physiology. Furthermore, many workers will not agree with his conclusions in regard to the efficacy of the hormones as therapeutic agents; however, he ably supports these by the laboratory and clinical evidence of others.

For the clinician a small paragraph at the end of each chapter summarizing the pertinent facts would be of great value. Many of the findings are difficult to remember correctly, and a short summary of the important ones would certainly increase the usefulness of this excellent book.

Biochemistry for Medical Students. William V. Thorpe. 475 pp. Baltimore: William Wood & Co., 1939. $4.50.

During recent years a great number of texts have appeared which deal with biochemistry as a medical subject. Biochemistry today plays an important role in modern medicine and in medical instruction in America. Whether the part assumed by biochemistry in this country is "top-heavy" and may at times mislead the investigator

in the direct pursuit employed in the experimental method, is not a question or a subject for a review. On the other hand, in England biochemistry as a subject in medical instruction has just begun in recent years to assume an important part in the curriculum, with an effort to balance its importance and to give it proper place without overemphasis. These facts must be considered when reviewing British textbooks of biochemistry for the medical student.

With this in mind, the book by Thorpe presents in a systematic way practically all that needs be known in biochemistry for the average medical student. It is lucid and clear, concise and informative, and easy to understand. To the American reader it can be recommended as an adjunct to the more detailed texts already present in this country. The book is an excellent presentation and review of biochemistry and is more than a bird's-eye view of the subject. It contains an excellent index and bibliography and should prove serviceable to the physician as well as to the inquiring student.

Priests of Lucina: The story of obstetrics. Palmer Findley. 421 pp. Boston: Little, Brown & Co., 1939. $5.00.

Dr. Findley has given the medical profession a most interesting, fascinating story of obstetric practices from the early stages to the present time. The ancient folklore combined with the ignorance and mysticism of the past makes absorbing reading. The book is illustrated with well-chosen reproductions showing early obstetric procedures and also pictures of the men who have made history in obstetrics. Dr. Findley brings the story of obstetrics up to the time of J. Whitridge Williams, who died in 1931.

In the second part of the book he shows in a most interesting manner how the study of anatomy was gradually developed, the development of the forceps and the status of the midwife, and there is a very comprehensive chapter on the history of puerperal fever. He closes with a full historical account of the development of the cesarean operation.

The book contains an excellent index and a full bibliography.

Dr. Findley's book is the result of a tremendous amount of research, and he has put his facts together in a charming way, for which those who are interested in the development of obstetrics must be truly grateful.

Sex and Internal Secretions: A survey of recent research. Edited by Edgar Allen. Second edition. 1346 pp. Baltimore: The Williams & Wilkins Co., 1939. $12.00.

The second edition of this book is a remarkably stimulating survey of a difficult subject. It is no easy matter to compress an account of increasingly new experimental evidence on sex and internal secretions into the compass of a volume of thirteen hundred pages yet this task has been accomplished. The twenty-four contributing authors, all active in research in this field, give an up-to-date account of the subject matter and address themselves to those readers who may be seriously studying the subject for the first time as well as those engaged in postgraduate work. Dr. Allen, in his preface, writes: "As in the first edition no attempt has been made to standardize various chapters; they appear with their authors' style uncramped. Effective choice of new work and elimination of overlaps between chapters have been aided by complete outlines approved before starting revision. From several points of view, therefore, this second edition is the product of 'teamwork.'"

The book is divided into five sections, each section developed under several chapters. The topics are: "Biological Basis of Sex"; "Physiology of the Sex Glands, Germ Cells and Accessory Organs"; "Biochemistry and Assay of Gonadal Hormones"; "The Hypophysis and the Gonadotropic Hormones of Blood and Urine in Relation to the Reproductive System"; "Additional Factors in Sex Functions and Endocrine Applications in Man." At the end of each chapter, there is a list of important references. There is an especially good index. The illustrations are well drawn and clear.

The present work establishes a high standard in this field of investigation, and it is to be hoped that continued support in this direction will come from the Committee for Research in Problems of Sex of the National Research Council, whose grants have made possible much of the work herein contained.

Biographies of Child Development: The mental growth careers of eighty-four infants and children. A ten-year study from the clinic of child development at Yale University. Part 1 by Arnold Gesell. Part 2 by Catherine S. Amatruda, Burton M. Castner and Helen Thompson. 328 pp. New York and London: Paul B. Hoeber, Inc., 1939. $3.75.

Are there certain personal behavior patterns in infants and small children — individual traits, actions or reactions — which are prophetic of what the future characteristics of such children may be? Dr. Gesell and his co-workers say, "Yes," and they have been engaged with the question for many years. Indeed, in many instances their forecasts have been strikingly borne out so regularly that the correctness of their inferences is beyond doubt. In this book some of the reports deal with cases originally considered in 1928 in the senior author's *Infancy and Human Growth.* The other case records are new. Altogether eighty-four growth careers are presented.

It may be readily granted that these studies are of great value to psychologists of infancy and childhood, but it seems equally true that there are as yet very few who are sufficiently trained to evaluate traits with anything like the certainty displayed by this group of workers. As matters now stand, the data seem too abstruse to permit of any very wide clinical application, however much such application is to be desired. Emphatically, this is a book for the specialist among specialists, but Gesell and his associates are to be commended for thus breaking ground.

The Organisms: A holistic approach to biology derived from pathological data in man. Kurt Goldstein. 533 pp. New York: American Book Co., 1939. $3.20.

This book is the result of observations on patients with lesions of the brain suffered during the World War. The first German edition appeared in 1934, and the English edition is essentially a translation of it, including, for the first time, references to American publications pertinent to the subject matter. The author's defense of his specific theory, — the holistic approach to the biology of the organism, — with a certain fanaticism, coupled with his persistent use of the personal pronoun "I" and his iconoclastic attitude toward such concepts as inhibition, antagonism, and so forth, is hardly designed to enlist a reader's prolonged interest. The point of view of the author is stimulating in many places throughout the book, and yet there is altogether too much verbiage clothing the simple morphological facts which he presents for consideration.

Preclinical Medicine: Preclinical states and prevention of disease. Malford W. Thewlis. 223 pp. Baltimore: The Williams & Wilkins Co., 1939. $3.00.

The idea of this book is splendid for it deals with the ideal of future medicine. After all, what physicians aim for is the prevention of disease. This book is a pioneering attempt to consider a very difficult subject; it tries to combine what is known about such fundamental scientific disciplines as genetics, constitution and heredity with predisposition to various illnesses. It is natural in such an effort — and this is obviously well realized by the author — that the early symptoms and signs of disease must frequently be included. The difficulty with the subject lies in the fact that in many conditions, particularly in chronic diseases, not much is known of causative factors. It is also this lack of accurate information which probably accounts for the fact that the organization of the book is sometimes complicated; thus, there is a distracting discussion of certain endocrine problems under the chapter dealing with the prevention of cancer, a discussion which properly belongs where it is because not enough of the subject is known to warrant a separate chapter. The reviewer thinks that this first attempt to consider a most important field of knowledge is well done considering the vast gaps in knowledge which confronted the author. Although the author has included all present available knowledge, it is to be hoped that more knowledge will be at hand for subsequent editions. As an early attempt in an important subject, this book is to be commended. It should act as a stimulus to those who are seeking for the causes of disease; it has a point of view toward the prevention of disease which can be highly recommended to practicing physicians.

Manual of the Diseases of the Eye: For students and general practitioners. Charles H. May. Sixteenth edition, revised with the assistance of Charles A. Perera. 515 pp. Baltimore: William Wood & Co., 1939. $4.00.

This manual is a time-tested reference book for general practitioners and medical students. The present edition brings the subject up to date. It condenses a mass of material into a small volume, with emphasis on the common affections of the eye and purposeful omission ot rare conditions and theoretical disputations. That it has accomplished its original purpose of being a handbook for a large number of practitioners is attested by the facts that this is the sixteenth American edition and that there are no less than forty-two foreign editions in nine different languages. The present edition keeps up the manual's tradition of brevity and practicality. An abundance of pictures, several of which are new, adds greatly to the purpose of the book.

The necessary superficiality of the book precludes its use as a text for ophthalmologists, and the dogmatism which is unavoidable in a manual may annoy one who is a specialist in the subject. Thus one is taken aback to read the unqualified but wholly questionable statement that, in congenital color blindness, "the color sense can be developed, if training is begun at a sufficiently early period of life." It is also difficult to understand why no mention is made of sutures in the otherwise relatively lengthy description of cataract extraction.

These and other similar defects are, however, of minor importance and in no way invalidate the book as a handy and relatively complete reference book for non-ophthalmologists.

Endocrinology in Modern Practice. William Wolf. Second edition, completely revised. 1077 pp. Philadelphia and London: W. B. Saunders Co., 1939. $10.00.

Considering the wide area of medicine which the author is attempting to survey and taking into account the further fact of the increasing complexity of the experimental results of investigators in this field, it may be said that he has achieved tolerable success in this second, revised edition of his book. New material has been added on protamine–zinc insulin, hypoglycemic states, endometrial suction biopsies, the autonomic nervous system and the vitamins. There is a chapter on diagnostic procedure, and one on the description and dosage of available endocrine products.

The author gives an adequate, logical account of the anatomy, embryology, histology, biology and physiology of each endocrine organ before dealing with its diseases. There are seven chapters devoted to the consideration of the endocrine aspects of non-endocrine diseases. The tabular summaries and the illustrations are good.

Criticisms which the author may be ready to accept concern, first, his attempt to be too comprehensive and, second, his deliberate omission of references to the more important papers in the various fields considered.

Diseases of the Nose and Throat. Charles J. Imperatori and Herman J. Burman. Second edition revised. 726 pp. Philadelphia, London and Montreal: J. B. Lippincott Co., 1939. $7.00.

The second edition of this book is a considerable amplification of the original textbook published three years ago. By increasing the number of pages and illustrations the book has been brought up to date and revised in a most thorough manner. This book should continue to prove extremely valuable to the postgraduate student and specialist who will find in it a most comprehensive consideration of rhinolaryngological conditions. Operative procedures in particular are clearly described and profusely illustrated. The somewhat encyclopedic arrangement of the book makes it particularly suitable as a reference work, and because of this the reviewer cannot enthusiastically subscribe to the book's intention expressed in the first paragraph of the preface: "To answer questions for either the general practitioner or the senior medical student." Readability has been sacrificed in the interests of comprehensiveness, and the somewhat impersonal style will fail in some measure to hold the interest of anyone but the specialist.

Les Erreurs et les Fautes en Urologie. L. Strominger. 176 pp. Paris: Masson et Cie, 1939. 45 Fr. fr.

This excellent book is entirely devoted to the errors in the diagnosis and treatment of diseases of the kidney, pelvis, ureter, bladder, urethra and prostate. There are no illustrations or statistics, but this is adequately compensated by the amount of information one finds in the text. The author must have given a great deal of time and care to the writing of this book, for it appears that not a single fact has been omitted in regard to the possibility of making an error in the care of patients with diseases of the urinary tract.

A chapter each is devoted to the relation between urology and surgery and to the errors in urological diagnosis, prognosis and surgery. One chapter is on errors in roentgenological diagnosis and is extremely well written. The book is stimulating on account of its frankness and is well worth reading.